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American Veterinary Medical Association

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AMERICAN VETERINARY REVIEW
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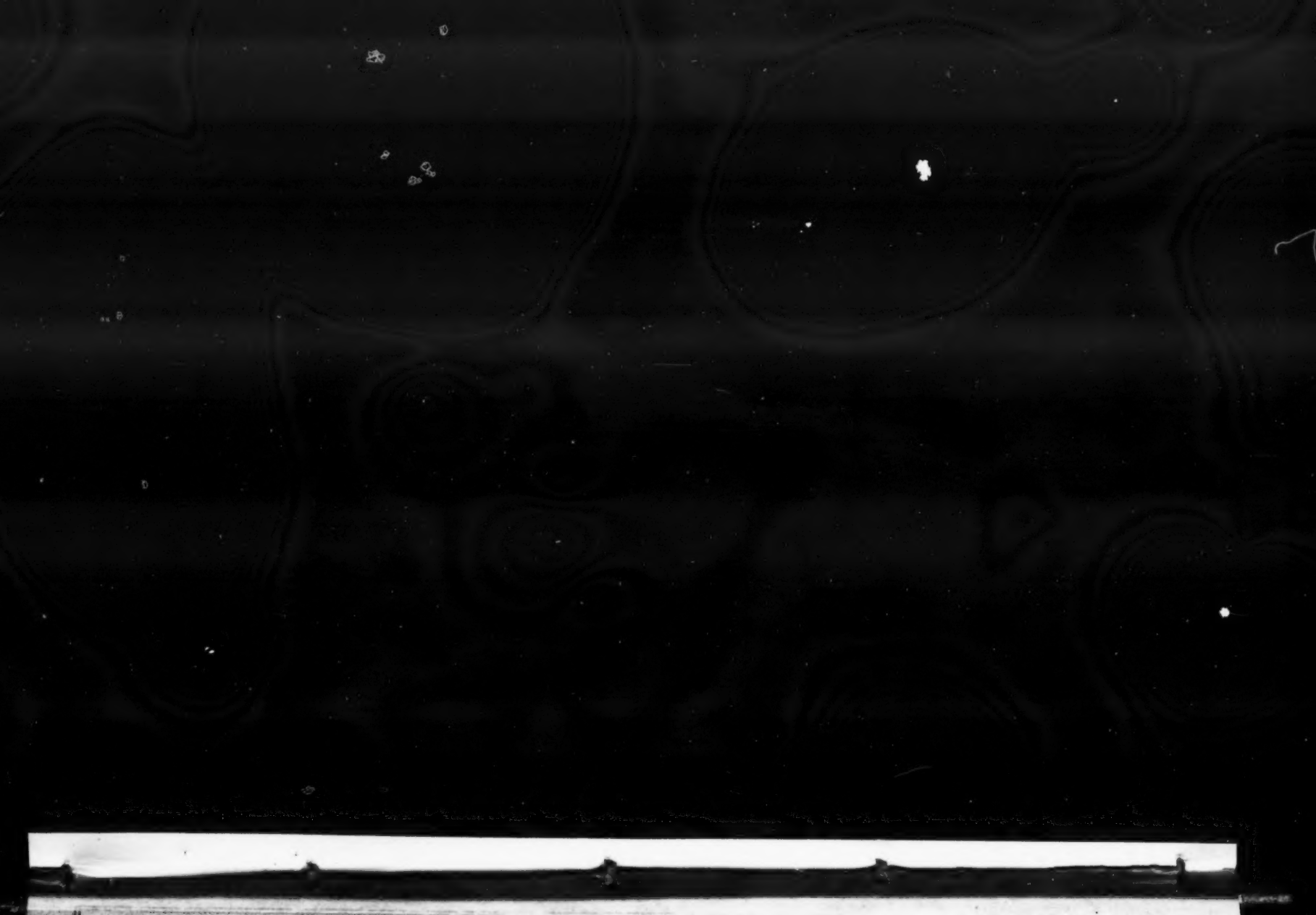

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VOL. LII., N. S. VOL. V. MARCH, 1918. NO. 7.

LIVE STOCK PRODUCTION AIDED BY VETERINARY PROTECTION

It is becoming more and more obvious that a continuous and sufficient food supply is of paramount importance in conducting the present great struggle in which we are engaged. As the preparations progress for carrying the conflict to a successful termination, our people are becoming more deeply impressed with the seriousness of the situation which confronts us and of the obligation which rests upon all citizens to serve the common cause. In a democracy like ours, every person, no matter how humble, has the opportunity of serving the nation in some way and it is very gratifying to witness the patriotic and willing spirit of service on the part of the people in every line of industry throughout the nation.

That our farmers and live stock raisers are alive to the situation and are impressed with the necessity of performing their part by increasing production in all lines of agriculture, is evident from the marked increase in our production of live stock, cereals, and other crops during the past year.

The official figures on crop estimates show that as a result of the increased activities to meet the imperative needs our farmers

have produced during the year 1917, approximately 3,191,000,000 bushels of corn, 659,797,000 of wheat, 1,580,000,000 of oats, 201,659,000 of barley, 56,000,000 of rye, 16,813,000 of buckwheat, 33,256,000 of rice, and 73,380,000 of kaffir. These figures show a production of more than 5½ billion bushels of cereal food crops, which exceeds by 1,000,000,000 bushels the previous five-year average for cereals. In addition, they have produced record crops of Irish and sweet potatoes, large crops of beans and sugar beets and also the largest production of perishables on record. Considering the disadvantage to which they were subjected on account of the scarcity and high cost of labor in rural districts, these results are most gratifying.

The official figures dated February 1 show the following estimates of our live stock resources of January 1, 1918:

Horses	21,563,000,	an increase of	353,000
Mules	4,824,000,	an increase of	101,000
Milch cows	23,284,000,	an increase of	390,000
Other cattle	43,546,000,	an increase of	1,857,000
Sheep	48,900,000,	an increase of	1,284,000
Swine	71,374,000,	an increase of	3,871,000

The marked increase in our live stock production during these war times is particularly gratifying since meat and fats are so essential to the rations of our Army and Navy, and it further indicates that the live stock raisers are doing not only their bit but their best in this time of national stress.

The farmer who by accelerated effort succeeds in increasing live stock is supplying meats and fats with which to bombard the enemy. Such ammunitions are as effective at this time as bullets and shells and the persons who supply and conserve them are contributing to the nation as equally valuable service as the soldiers who fight in the trenches.

On every side our live stock interests are threatened by pestilence and disease and their protection is worthy of the most earnest consideration of our profession, especially so under the present conditions. It therefore behooves all veterinarians to do everything in their power to look after the health and condition of our vast live stock resources, taking care of the individual animals as they become sick and never forgetting to report promptly to the State and Federal authorities all outbreaks which have the slightest appearance of an epizootic.

It is conceded that we have resources of various kinds in larger measure than any other country in the world and we are just beginning to realize the enormous power of the nation, aroused in righteous indignation to the full sense of its duty in the war waged with a determination to protect our rights and enforce a just and permanent peace. There is no doubt that when the war has been successfully won and peace is declared, the final analysis will show that our farmers, our live stock raisers, and our profession have performed their duty with patriotic zeal and have rendered individually and collectively the great service of which they are capable. J. R. M.

SALVAGE

War must not be regarded as all waste, although wastage is one of its predominating effects. Conservation must accompany it and reclaim all that can be again utilized. Although not usually considered in such terms the principal service of the medical and veterinary corps is salvage. The surgeons save and repair, so far as possible, the human wrecks brought to them from the battle fronts and restore them again to active service, or, if incapacitated for that, for such usefulness as is possible along civilian lines. The veterinarians likewise repair wounded and sick animals that they may again return to their duties. Quite properly we regard this work from a high and humanitarian standpoint but essentially it is salvage.

The war cannot be won by wastefulness. At the front and along the lines it cannot be altogether avoided. Behind the lines it can be restrained. The salvage of human and animal lives must rank first, but the more it can be extended to other military articles and equipment of the soldiers and animals, the less will be the financial strain upon the government and this, in its way, will contribute to the winning of the war. It is proper that the people at home should conserve to supply the needs of the army. It is also proper that the army should conserve, in all reasonable limits, for the sake of victory.

Germany, with her reputation for efficiency, has undoubtedly conserved for many years to be able to carry on the war, and with her fore-knowledge of the wastefulness of some of the allied nations, probably counted upon this factor as one of the elements

which might enter into their defeat. America has doubtless been regarded as a fat and rich nation with little claim to a reputation for thrift. Perhaps there has been some reason for this view in the past, but with her existence as a free and democratic nation at stake, a transformation into a well regulated and efficient power for the enforcement of law in the world is by no means an improbability.

After a few months of the war, England awoke to the terrific waste that was taking place and arose to the situation. At first salvage was casual and depended upon the enterprise or initiative of individual officers. Now it is a full fledged war office department with a complete and far reaching organization all its own and dedicated solely to rehabilitation. It saves the British Government millions of dollars every year. It was once rejected and abused but has developed into one of the permanent benefits of the huge conflict. In the matter of clothing alone, salvage saves Great Britain more than $12,000,000 annually.

In the veterinary branch, aside from the repair of the animals themselves, the salvage from the equipment, harness, saddles, bridles, blankets, hides from the dead animals, fat, glue and other material obtainable from the bodies, offers possibilities of reclaiming much valuable material from the wastage of war. Problems which have never occurred before have developed during this great conflict. Details, which previously were insignificant, have now assumed new importance, and no detail, however insignificant, should be overlooked, if it will contribute to the success of the cause. The antidote to wastage is salvage. P. A. F.

EUROPEAN CHRONICLES

Bois Jerome.

Contagious Pustular Stomatitis of the Horse, Equine Variola and Vaccinia.—The *Journal of Comparative Pathology and Therapeutics* in its issue of September, 1917, contains an article of great importance on the relationship between these affections.

Doctor D. A. de Jong, Professor and Director of the Laboratory of Comparative Pathology in the University of Leyden, is the author and his subject is divided into four chapters which successively treat: 1st, of the history of these pathological questions;

2d, of the contagious pustular stomatitis in Holland in 1914; 3rd, of his own experimental researches, and 4th, of the conclusions with final remarks.

In the first chapter the author considers the subject, from the discovery of the cow-pox and horse-pox of Jenner. The references made relating to Jenner, to the works that were written following his discovery to the many writings which were successively and at intermittent epochs published by the French, the German and Austrian authors as well as the differences presented and discussed by the various writers, are the subjects of great interest, which form a very good opening for the second chapter.

There has lately been considerable writing in relation to contagious pustular stomatitis of the horse and on that account the history presented by Prof. de Jong will attract much attention.

In the second chapter of his article, the author takes advantage of an outbreak, which he witnessed, to give the description of the various manifestations presented by the diseased animals. Two illustrations of the aspect of the buccal mucous membrane and cutaneous lesions of the neck can be readily recognized by those familiar with manifestations of pustular stomatitis.

The chapter relating to experimental researches which were carried on animals and children and their reproduction closes with the following: "We believe that by the researches which have just been described, we have proved in a satisfactory manner that equine variola still exists. The conception of the French school has been confirmed and it has been shown that the opinion of those who wish to separate contagious pustular stomatitis of the horse from vaccinia is not founded." With these, the fourth chapter of conclusions is presented, as the results of the experiments made:

1. In the observed cases of contagious pustular stomatitis of the horse, there was an eruption in the mouth and on the skin.

2. In the experiments, material collected from the mouth of the animals affected, proved capable of transmitting the disease, including cutaneous eruptions.

3. This material, after it had been passed through Chamberland B and F filters still possessed the same infecting qualities.

4. The ordinary vaccine, propagated in the usual manner, was equally capable of giving the horse pustular stomatitis, including cutaneous eruptions. The horse which had contracted the stomatitis spontaneously was refractory to inoculation with vaccine.

5. Two different strains of the virus of contagious pustular stomatitis of the horse behave like vaccine when inoculated into the calf and into the rabbit and in the latter Guarnieri's corpuscles were present in the inoculated cornea. Besides, the complement test furnished corroborative evidences in support of this view.

6. The vaccine obtained by inoculating with the virus of contagious pustular stomatitis of the horse could be propagated in animals with the same regularity as the ordinary vaccine. This vaccine derived from the horse gave excellent vaccinal pustules, when inoculated into children.

7. The rabbits that had been inoculated with ordinary vaccine and had shown a marked positive reaction after recovery and revaccination with the virus of stomatitis showed only a precocious allergic (Von Picquet) reaction, whereas the control animals showed a characteristic reaction.

8. We have proved that contagious pustular stomatitis of the horse is actually the most frequent form of Jenner's horse-pox and that the virus of the stomatitis passes through Chamberland B and F filters. *This fact was not previously known.*

A few final remarks upon the outbreak from which Prof. de Jong started his investigations close this very valuable addition to the solution of the problem in view.

MAMMARY TUMORS IN THE BITCH.—In references already alluded to in previous numbers of the *Journal,* I have pointed out some remarks made by Professor G. Petit of Alfort, who has made a very interesting study of the mixed connective tissues of the canine mammal.

Among the publications relating to the subject which have already been made by the learned professor, I find one published in the *Bulletin de la Societe Centrale* which refers to the neoplasms that result from the association of sarcomatous, cartilaginous and osseous tissues.

Beginning his subject with remarks alluding to pure osteo or ossified chondromas and to the adenoma osteo-chondroma, the writer goes on to say that the tumors which form these neoplasms, which he will describe further, are new examples of the multiplicity of tissues of a conjunctive nature.

Three cases are recorded and if, as Petit says, it is always interesting to understand the pathology of the tumors observed, it

is certain their reading will be of interest as it is not merely sufficient to remove a mammary tumor, but essential to know its nature.

The first observation is one of *Pseudo-Cystic Sarco-Osteoma* (Fig. 1). The last two expressions being used in preference to *Osteo-Sarcoma* which relates especially to malignant tumors of bones issued from the periosteum or the marrow.

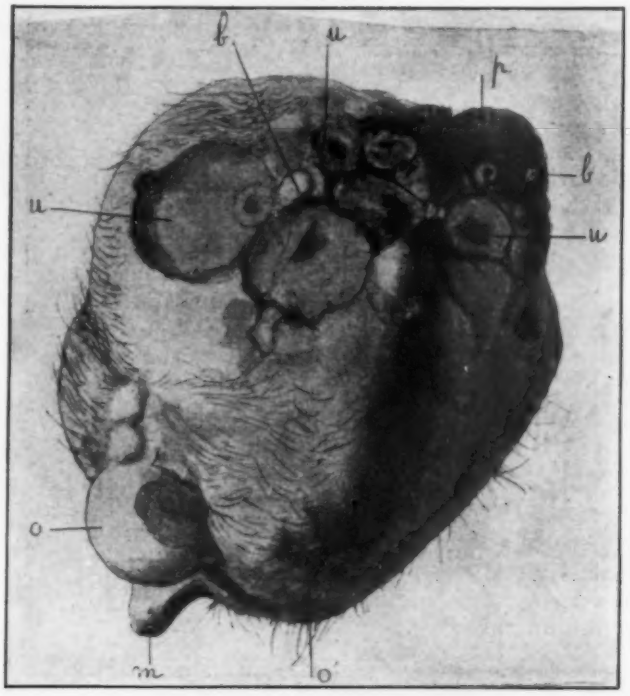

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FIG. 1. Sarco-Osteoma of an inguinal mammae (slut) (slight reduction).
p—Intact skin, covering the tumor.
b b—Sarcomatous nodules.
u u—Ulcerations due to the progressive destruction of the nodules.
u'—Larger ulcer of same origin.
m—Teat.
o—Osseous nodule under the teat.
o'—Another of same character but deeper.

In this case, the tumor was globular in shape, of the size of a man's fist and showing on its surface, close to the intact teat, a projecting nodule covered with thinner skin and which corresponded to a bony center as large as a hazel nut. On section this was found surrounded by fibro-cartilage. The superior extremity

of the growth was covered with ulcerations, varying in size, some small and others as large as a twenty-five cent piece and separated by immediate projections or pimples irregularly disseminated.

The histological examination showed that the tumor was a fasciculated sarcoma.

The second observation was a *Sarco-Chondro-Osteoma* (Fig. 2) with the coexistence of *Fibro-Adenoma.*

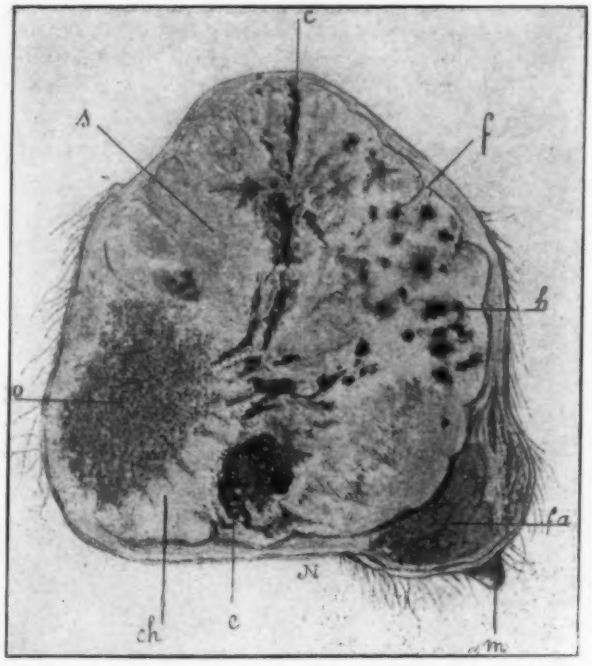

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FIG. 2. Sarco-Chondro-Osteoma of the mammae—with coexistency of fibro-adenoma (slut).
o—Osseous ulcers.
ch—Fibro-cartilage of this bone.
c c—Pseudo-cystic cavities resulting from the necrosis of the tumor.
h—Hemorrhagic spots, frequent in sarcomas.
f—Fibrous envelope of the tumor.
fa—The other mammae atrophied by the progress of the adenoma.

It formed a tumor of 500 grammes in weight, irregularly mammilated, and involving three mammae, the two inguinal and one ventral. The teats remained intact, projecting but displaced on the surface of the growth. The skin was not ulcerated but stretched, shining, hairless and closely adherent to the tumor. On section,

exactly above one of the teats a hard bony nucleus with diffused limits was found. In its center it was real bone and all around was a fibro-cartilaginous zone, lardaceous and extending into the surrounding tissues.

The microscopic study demonstrated that the cartilaginous transformation was nearly general in the center of the tumor and that the process of chondrification existed all through it.

The third case was one of *Ossified Chondro-Sarcoma* in a mammary gland of a bitch (Fig. 3).

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FIG. 3. Enormous ossified chondro-sarcoma of the mammae (slut).
s s—Sarcomatous tissue, with its ordinary lobulated aspect.
o—Diffuse osseous nodule, developed in the sarcoma.
c—Large pseudo cyst, anfractuous and cleared of its contents, crystals of cholesterine.
k—Pseudo cyst.
j—Remains of glandular tissue.

Enormous tumor, globular and oblong, weighing two kilograms (over four pounds), resembling in its shape and size a hu-

man cranium covered with a shining skin, thin but intact, and not ulcerated, it presented small deformed elevations, the remnants of teats which are frequently observed in old bitches.

A median section, made with a saw on account of its bony structure, showed at the periphery an enveloping fibrous capsule underneath and united to the skin. Then a solid mass, dense and compact, representing the tumor which was hollowed by two large pseudo-cystic cavities filled with some effusion, which became coagulated after formol action into a gelatiniform clot of great consistency and brown color.

A minute description of the histological examination of the intimate structure of these three various forms of mammary tumors completed the very interesting communication of the bulletin.

Infected Wounds and Their Treatment.—Many have been the various therapeutics lately advocated in relation to infected wounds and among them has been the use of common trade Javelle solution. At the Academie des Sciences Doctor Cazin and Mrs. Krongold have discussed the use of this compound and their remarks throw a different light upon what has been advanced by others.

They said: "To resort to Javelle's water diluted, in the treatment of infected wounds, has been very wrongly considered as useless, because of its irritating properties, which really do not exist when the dilution is sufficient."

Contrary to the results obtained by Daufresne with too strong a solution, the action upon the human skin of a solution at 15 per 1000 is harmless, and after remaining twenty-four hours in such solution, pieces of skin submitted to an histologic examination presented an absolutely normal structure.

If on the contrary, similar pieces of skin were left in the hypochlorite of soda of Dakin or in a surgical hypochlorite of Daufresne, or in a solution of Javelle's water at the same standard in hypochlorite of soda as the last, only a stay of twenty-four hours will show under the microscope an entire destruction of the epidermis and of the dermo-papillar layer with also a mortification and partial dissociation of the fasciculi of the connective tissue of the dermis.

Drs. Cazin and Krongold have observed, as Dr. Daufresne,

that a Javelle solution at 0.50 gram per 100 of hypochlorite of soda alters the skin; but it is not a 0.50% solution that they advocate for surgical use. It is solutions containing only 15 grams of Javelle water for one litre of water and containing only 0.042% of hypochlorite, that is twelve times less than either the Dakin or Daufresne solutions.

The authors of this communication have treated with the Javelle solution at 15 per 1000 a large number of infected wounds of all kinds, and of extensive and varied severity, and out of over 500 wounds they had only to record two deaths; one from tetanus and the other from liver trouble.

The solution of Javelle water at 15 per 1000 has proved a superior bactericidal agent without any irritating or caustic properties, which seem to be due only to the great proportion of hypochlorite of soda existing in some preparations.

Uremia of Acarian Origin.—Uremia has been observed frequently in horses affected with mange by Veterinary Aide Major Leneveu and he has made it the object of a communication for the *Recueil*.

The symptomatology presented is divided into general manifestations and those of a variable nature.

Among the general symptoms he calls attention to alterations observed in the urinary apparatus, viz: in the quantity and the quality of the urine. It was darker in coloration, thick and oily in consistency and frequently showed presence of albumin.

Loss of flesh was also apparent. It was either rapid or slow and gradual until it reached extreme limits. The tail became flabby, and apparently twisted, corkscrew-like, in four or five curves in its length, the curves having different directions.

There did not seem to be much variation in the temperature.

In the circulation the pulse was strong without exaggerated arterial tension, 40 to 42 beats a minute. In two cases it dropped to 28 and 30.

The various manifestations are recorded as follows: appetite generally good up to the last stage of the disease, sometimes diarrhea, feces had a very fetid odor. Respiration was slow, pulmonary edema was observed, also irregular breathing. Congestion was observed in two cases.

The apparatus of innervation presented also interesting symptoms. The comatose form was the most frequent. Some cases had choreic manifestations, meningo-cephalitic symptoms were also noticed. Some animals had contracture of the left muscles of the neck, etc.

The lesions constantly observed were in the kidneys. They were congested and hemorrhagic. There were also found pulmonary congestion, edema of the lungs, hemorrhagic spots in the small intestines and congestion of the brain and its envelopes.

The march of the disease varies. Some cases under proper treatment recover. Others lose flesh and die in a few days. Others last for months.

The treatment indicated is summarized in the removal of all cutaneous impurities, destruction of the parasites, and prevention of the intoxication by good hygienic measures, good regime and feeding accordingly.

The first indication is carried out by the cleaning of the skin with warm solutions of carbonate of soda.

To destroy the parasites the author advocates the baths or acaricid solutions or the sulfurous gas.

For the third, diet of milk when it is possible. Diuretics of acetate of ammonia. No internal drugging, as it is likely to irritate the kidneys. Rich, abundant feeding. General and cutaneous hygiene must not be neglected.

BIBLIOGRAPHY—THE CLINICAL PATHOLOGY OF THE BLOOD OF DOMESTICATED ANIMALS by Samuel Howard Burnett, A.B., M.S., D.V.M., Professor of Comparative Pathology, New York State Veterinary College, Cornell University, Second Edition, revised and enlarged.

This is the title page of a work that the author has affectionately dedicated to his teacher, Professor James Law, and through his kindness has been sent to me by the publishers, The Macmillan Company of New York. To them I address my thanks.

The pathology of the blood of the domesticated animals cannot escape the close attention of a student of comparative pathology and especially of one who might be designated to occupy such a chair in a school of veterinary medicine or in an institution where such a department exists.

Professor Burnett has been a student of that special branch of medicine. He has published many articles on comparative pathology and after a first edition he presents another, more complete, revised, enlarged and illustrated, thus filling by an excellent work a vacant space in the library of the student and no doubt also of the practitioner of our medicine.

Such is the object as announced in the preface and also the intention of the author to render accessible for investigation data concerning the blood of commonly used experimental animals.

Many are the publications that have been offered in relation to the blood, but the work of Prof. Burnett will prove of immense value to those interested in the subject. Indeed, how could one not be when the contents of the book are considered? Let us glance at them.

First, we are introduced to the methods of examination, followed by the morphology of the formed elements, the normal blood, the variations in red corpuscles and hemoglobin, the influences affecting the leucocytes, all of which form the first five chapters.

Now we come to the true pathologic part, the special diseases of the blood, the general and infectious diseases, those especially due to bacteria and fungi, those due to protozoa, those whose cause has not been definitely determined and finally those due to animal parasites.

Six chapters cover that interesting field where successively the condition of the blood is presented and illustrated.

Illustrations accompany the text: four colored and twenty-three in the text.

Added to the valuable contents is a long list of references at the conclusion of each chapter. This affords an opportunity of appreciating the value of this little work of 160 pages.

Comparative pathology may perhaps as yet be only a growing science, although the object for study by many, it is but recently that chairs have been created, that societies of comparative pathology have been organized and that even its own press has been inaugurated. The work of Prof. Burnett will not escape attention. It deserves it.

Summary from Recent Publications Received and Bibliographic Notes.

Those marked "X" will be summarized. Those marked "O" will appear in abstracts.

Veterinary Journal—Report on ulcerative cellulitis—Ulcerous lymphangitis—Report on contagious necrosis in horses—(X) Arecoline hydrobromide in colic—The forest fly—(O) Fibromyoma in abdominal cavity of a retriever.

Veterinary News—(O) Clinical notes.

Veterinary Record—Chorea in the cow.

Cornell Veterinarian—Anatomy of the cow—Parasites affecting sheep—Possibility of eradicating parasitic infections from the earth—Etiology and mode of infections of white scours—Transmission of antidotes (agglutinins and complement fixing) from mother to fetus in utero.

Recueil de Medecine Veterinaire—(X) Oxyurosis of equines—Physico Physiology of traumatic abdominal hernia.

Bulletin de la Societe Centrale—(O) Demodectic mange of horses with contagion to man—(X) Effects of asphyxiating gases in horses—(X) Morphine in intravenous injections in colics—(X) Dental and peridental affections in the horse.

Revue de Pathologie Comparee—Synchysis in horses.

Annales de L'Institut Pasteur—(X) Contributions to rabies in guinea pigs—Study on bovine pest.

Revue Generale de Medecine Veterinaire—(X) Polyvalent serum in dog distemper.

Bibliographic Notes—Clinical Pathology of the Blood by Dr. Burnett—Investigations upon the Cause of Worm Nodules in Cattle by C. G. Dickinson and Gerald F. Hill—Bovine Tuberculosis by Dr. J. F. Devine.

A. L.

—The Sixth Annual Meeting of the Southern Cattlemen's Association was held at Little Rock, Ark., February 6, 7 and 8. Dr. J. A. Kiernan, Chief of the Tuberculosis Division of the Bureau of Animal Industry, read a paper on "Accredited Tuberculosis Herds", and Dr. A. Eichhorn of the Lederle Antitoxin Laboratories presented a paper on the "Prevention of Anthrax and Blackleg". The convention was well attended and the best representatives of cattle breeders from the South were present. Dr. R. M. Gow, State Veterinarian of Arkansas, was reelected secretary of the association.

LIVE STOCK PRODUCTION AND THE VETERINARIAN*

F. TORRANCE, B.A., D.V.Sc., V.D.G., President A. V. M. A.
Ottawa, Canada

While waiting patiently for that "peace with honor" which is slow in coming, we may reflect that out of evil good has come. This frightful war has bound the democratic nations together in a common aim, so well expressed by your president, to "make the world safe for democracy". It has given a new and wider meaning to the motto of the United States, E Pluribus Unum, uniting the allies together in one common aim to battle against the powers of darkness and restore to suffering humanity the blessings of liberty, freedom and peace.

In this fight the veterinarian has his part, and will "do his bit", *in* the army or *out* of it, for the good of his country and the honor of his profession.

The scarcity of food, the high cost of living, the price of beef and bacon, have forced on everyone the realization of how near starvation the world has come. In America, where peace and plenty have been with us so long, it is new and strange to have meatless and wheatless days. We accept them as necessary and are glad to do what we can to save food for our fighting men and our allies less fortunately situated than ourselves. We are hoping that scarcity is but temporary and that by a little special effort on the part of our farmers, production will be speeded up and the deficiency made good.

How great has been the destruction of live stock by war is not fully realized, and probably only partly known.

It is estimated that the world's live stock has already decreased over 28 millions of cattle, and the loss is continuing from day to day. High prices have tempted our farmers to sell young stock, and breeding stock that should have been matured or kept for breeding, and we have reached a situation where a strong effort must be made to conserve our live stock before disaster reaches us.

The campaign to increase production is in good hands. A

*Presented at the 10th Annual Conference for Veterinarians at Ithaca, N. Y., January, 1918.

vigorous and widespread propaganda is bringing to bear on our live stock men, our ranchers and farmers, every influence from patriotism to self interest to induce increased production. The veterinarian can do his bit in helping this movement, but in my opinion his services will be much more valuable in the protection of live stock against disease.

The losses from disease, especially contagious diseases, amount to an enormous sum. The United States were startled by the cost of suppressing foot-and-mouth disease, but loses more every year from hog cholera than foot-and-mouth disease eradication cost, and hog cholera is here still and appears to intend to stay.

I would like to give you some figures, and as you know that "figures can't lie, but liars can figure", I would protect myself by saying that the figures are from the Report of the Secretary of Agriculture for the year 1915. The loss in that year from hog cholera was $75,000,000; Texas fever, $40,000,000; tuberculosis, $25,000,000; contagious abortion, $20,000,000; other contagious diseases of food producing animals, $40,000,000, making a total of $200,000,000.

This enormous sum lost to the country through animal diseases in one year is startling. One might ask, what is the veterinary profession doing about it? Are we doing all that we can to diminish these losses?

Mr. Hoover says that the winning of the war is, "in a large degree, a problem of food supply and the ships to carry it". "Every pound of fat is as sure of service as every bullet, and every hog is of greater value to the winning of the war than a shell."

On every side is heard the cry for increased production. The farmers and breeders are responding nobly and we may reasonably expect under favorable conditions of weather that this year's crops, both vegetable and animal, will equal if not surpass the average. How can the veterinarian contribute to this end? Chiefly by promoting the health of our live stock by giving useful information on feeding, sanitation, and the care of young animals, by skilful treatment of the sick, and by prompt action when dealing with contagious diseases. The practitioner is not as often as he should be, the friendly adviser of his farmer client. It is difficult for the busy practitioner to find time to make the calls of his daily round and he is apt to neglect to furnish the information which

explains the cause of the disease he is called in to treat and thus enable his client to avoid it in the future.

The same rush and hurry induces the busy practitioner to make snap judgments on his cases; rash, hasty diagnosis without a proper examination of the patient. Every practitioner of experience can recall mistakes of this kind, not creditable to his skill and sometimes damaging to his reputation. These mistakes are sometimes, and I think generally, the result of *not looking* rather than of ***not knowing.***

Where contagious diseases are dealt with, mistakes in diagnosis are very serious and may result in heavy loss to the country, for instance, mistaking mycotic stomatitis for foot-and-mouth disease and vice versa. In all cases of doubt the practitioner should lose no time in calling on the proper government officials to investigate promptly, so that if necessary, proper control measures can be adopted.

In control of contagious diseases much remains for the veterinarian to do. Tuberculosis, in spite of much talk and millions of tests, continues to take heavy toll of our cattle and hogs. It causes annual losses amounting to millions of dollars, and unfortunately appears to be extending its ravages more widely from year to year. This appears to be fairly well established by the abattoir returns of hogs affected with tuberculosis. These show a steady increase of the number affected, at the rate of almost 1% per annum.

As hogs derive the infection from tuberculous cattle, this should warn us to get busy and deal with tuberculosis on a comprehensive scale before it is too late. The public is now aware of the danger of tuberculosis as never before and ready to accept measures of control that a few years ago would have been impossible.

It is an encouraging sign to have breeders and veterinarians joining in friendly discussion of the subject and agreeing upon the conditions for accredited herds. This shows that the antagonism so long existing between breeder and veterinarian on this subject has been replaced by a common desire to get together and do what is best under the circumstances.

There is one feature of the tuberculosis question which, in my opinion, should be dealt with at once and that is, the pasteurization or sterilization of the by-products of butter and cheese factories. Raw skim milk, buttermilk, and whey will readily trans-

mit tuberculosis to hogs or calves and is responsible to a large extent for much of the disease in swine.

Practitioners can advise farmers to boil these foods where there is difficulty in having them pasteurized, and if this were widely adopted, there would be a corresponding diminution in the disease.

The practice of allowing hogs to live with cattle in the same feed lots or buildings should also be strongly condemned on account of the transmission of the disease through the feces of affected cattle. This practice is so common in the corn states and elsewhere that it will be difficult to change, but the effort is well worth while.

Hog cholera has been scotched but not killed by modern methods of immunization. While these are undoubtedly of great value they will not eradicate the disease without also making use of other methods of control, such as cleaning and disinfection of stockyards and cars, control of the movement of hogs from infected premises and districts, and better sanitation on the farms. These have been and are much neglected. Serum and virus have their place in the control of this disease and are extremely useful when used under proper conditions, but should not be considered the whole thing. Of what use is it to immunize hogs if no effort is made to clean up and destroy infectious material, and to confine infection within bounds? The situation is better than it was a few years ago, but with an annual loss of forty million dollars in the United States there is still much room for improvement.

Contagious Abortion is a subject on which we are still waiting for the last word of how to deal with it. Much has been learned about it since Professor Bang discovered its bacillus, but very much remains to be discovered before we can deal with it effectually. Professor Williams' work shows that good results can be obtained by sanitary methods and proper treatment of aborting cows. Sir S. Stockman has had much success in his method of producing immunity, a method which we are following to a limited extent in Canada.

The disease is, however, so insidious, so widespread, so varied in its mode of infection that we are still far from knowing the best way of handling it. Practitioners can add much to our knowledge of the disease by keeping accurate records of herds under their treatment and reporting their observations. Progress in investiga-

tion is necessarily slow, as months and sometimes years must elapse before the full effects of a line of treatment can be known, but from what has already been accomplished, we may hope for a favorable solution of the problem in the future, even if it appear somewhat remote.

Of other contagious diseases it is necessary to speak only briefly. Texas fever and the eradication of the tick from over half of the area formerly infected is an achievement the profession may well be proud of. Its value to the South needs no further demonstration. Tick fever must go, and will go. Blackleg, anthrax, hemorrhagic septicemia, and many minor diseases are now handled by scientific methods with more or less success, depending largely on the promptness with which control measures can be applied. Practitioners can be of great service in most of these cases. They are usually the first to be called in and have it in their power by careful diagnosis and prompt notification of authorities where this is necessary, to shorten the time that must elapse between the discovery of the disease and the application of the remedy.

Many other things will occur to you, lines in which each can "do his bit" to the great end in view, the winning of the war. It is not offered to all of us, the privilege and honor of fighting for our homes and our country, but we who have to remain behind can all do something to support those in front and to "keep the home fires burning".

—Dr. V. A. Moore, Dean of the New York State Veterinary College at Cornell University, was a guest at a joint meeting of the Chicago Medical and Chicago Pathological Societies on February 6. He gave an illustrated address on the subject of Bovine Tuberculosis, Its Diagnosis and Control. The inclement weather prevented a large attendance, but much interest was evidenced in what was said. The subject was presented in a very earnest and sincere manner and the lantern slides were very good. It is hoped that Dr. Moore may be able to meet with the societies again.

—Veterinarians of Southern California who have turned farmers are anxiously waiting for "the clouds to roll in". Not an inch of rain since last April.

THE WORK OF THE BUREAU OF ANIMAL INDUSTRY AND THE WAR*

U. G. Houck, Washington, D. C.

We all believe in the principles for which we are fighting, our people have come to a better appreciation of the fact that a grave situation confronts our country and our attention is concentrated on winning the war. It was realized from the beginning that our task is a great one and that it is rendered more difficult since we have not only our own welfare to consider but we must also contribute to the support of our allies who were engaged for nearly three years before we entered the conflict and who in time of peace depended upon us to supply them with great quantities of food and other necessities.

The Food Supply. Armies, ships, guns, and ammunition are essentials of warfare, but they are powerless unless the food supply is maintained. Our soldiers, sailors, and allies must be fed well to fight well. The civilian population that is contributing to the cause through labor and industry must be fed and clothed, and we are under obligation, if for no other than humanitarian reasons, to help feed those in foreign lands who have been impoverished and made homeless and helpless through the devastations of war.

It is obvious that a continuous and sufficient food supply is of paramount importance in conducting the war, for it seems possible that victory may be won by bread instead of by arms. It seems even now that the enemy countries are suffering from an accumulation of miseries as the result of underfeeding and overwork. Germany has given a masterful demonstration of effective organization and direction of her food supplies, but there is a limit to human endurance and when that limit is reached disease and discontent multiply rapidly. The scarcity of food in those countries may ultimately contribute to our success, but the struggle will test our endurance and ability to keep up the supply of food.

For many years preceding the present war those European nations, now our allies, were in a great measure dependent upon the granaries and abattoirs of the United States and Canada for most of the food supplies necessary to make up the deficiency be-

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tween their production and needs. The occupation of fertile land by armies and the diversion of 40 millions of men and women from European farms and other productive pursuits into the armies and war industries have resulted in increased consumption and a marked decrease in production which has multiplied the normal demands upon our resources. Under existing conditions, therefore, the United States and Canada must prepare to feed a considerable proportion of the population of Europe for some time to come. A survey of the combined food supplies on which we and our allies must subsist for the next year shows that they are not sufficient unless they are administered with great care and that we must produce food in greater quantities than ever before.

Our farmers have responded energetically to the call for increased production, especially of cereals, and it is expected that they will surpass all previous efforts and records during the present year.

THE LIVE STOCK SITUATION. The live stock situation and the bread problem of Europe are giving the United States Food Administration much concern. It is well known that for a number of years preceding the war our live stock production has lagged behind the rapid increase of population until we have become an importing nation of meats and dairy products. In the year 1900 we exported large quantities of meat, lard, and oleo, and in addition, our exports of live cattle amounted to 43 million dollars, while the imports of meat amounted to only 2½ million dollars. In 1914, we had actually 10 million less meat animals than in 1900, and we exported only 6 million pounds of fresh beef against 180 million pounds imported, chiefly from the United Kingdom, Canada and the South American countries. Between 1914 and 1917, there was an increase of about 12 per cent in cattle production and 8½ per cent in swine production, but there was a considerable decrease in the number of sheep raised.

Naturally the belligerent nations of Europe are reducing their herds and flocks by slaughter to an extent far beyond their annual production, and it may be expected that they will continue to reduce them to the end of the war or until they have left only sufficient animals to supply the milk they must have. We have it on the authority of the U. S. Food Administration that notwithstanding the increase of cattle and hogs in the United States since the war began, there has been a world decrease of about 28 million

cattle, 55 million sheep, and 33 million hogs. This reduction of food animals involves not only the supply of meat and dairy products, but also fats, wool, and leather. The necessity of increasing animal production in lands where it is possible to do so becomes apparent not only to meet the food problem of the day but that we may be ready to help supply the enormous demands that are inevitable at the conclusion of the war. European countries must necessarily continue to rely upon us for a long time after peace is declared to furnish large quantities of animal products, and their depleted herds must be replenished as rapidly as possible. It seems evident that by the time the war is over the herds of Europe will be so reduced that there will be much less use for animal feeds and the acreage thus made available for bread grains will be increased to an extent that there will be a marked decrease in the demand for our wheat and corn. Therefore, the outlook for the live stock producer is promising and the American farmer should be brought to realize that for a considerable period after the war there will be less foreign demand for his grain and a greater demand for his animals and animal products.

Control of Animal Diseases. The efforts that are being made to induce increased production of live stock are closely related to the control of animal diseases. It is estimated that the annual losses in the United States from such diseases amount to the enormous sum of 200 million dollars or more and it is believed that three-fourths of these losses are preventable. In the past, our farmers have suffered with equanimity, losses that from a national viewpoint are now more serious than ever before. What action should be taken to prevent these losses? In a recent address, Dr. Mohler said, in referring to the losses from animal disease:

> "Some diseases may be prevented by the intelligent action of individual farmers, while others must be dealt with through systematic organized campaigns under Government and State direction. Even in the latter cases, however, the cooperation of individual farmers is necessary. The systematic eradication of animal diseases calls for executive action, such as quarantine, inspection, systematic treatment, etc., but there must be at the same time the dissemination of information among stock owners and the intelligent application of sanitary methods on the farm."

In these few words Dr. Mohler has indicated the most important lines of endeavor that should engage the attention of Federal and State authorities, and also the veterinary practitioner. The veterinarian is in a favorable position to do educational work among farmers, and he, who by his knowledge and skill is able to reduce the losses from animal diseases or through advice, is able to induce increased production, is contributing as equally valuable service to his country as the veterinarian in army uniform or the soldier who fights in the trenches. Never before has the veterinarian had such an opportunity to demonstrate the value of his services and never before was there such an occasion for him to strive to accomplish more than he has hitherto attained. It is believed that when the war is done and peace is declared, the final analysis will show that the veterinary profession performed its duty with patriotic zeal and rendered the distinguished services of which it is capable in this war.

The steady decrease in live stock production and the persistent increase in the cost of meats and other animal products for a number of years past were matters of universal concern, and various projects were pursued by the Bureau in cooperation with the States looking to the stimulation of live stock production and the prevention of losses from destructive diseases. Much was accomplished by the methods employed and when the war storm broke upon us it was found that the established lines of work were suited to the needs as far as they went; but in order that a more vigorous and widely extended attack might be made on animal diseases and new projects undertaken to stimulate animal production and conservation, the Congress included in the Food Production Bill a sum to be used for such purposes in addition to the regular appropriation.

It might be of interest at this time to discuss briefly some of the work that is being done by the Bureau to help solve our present-day problems and prepare for the future.

Dairy By-Products. The statement has been made authoritatively that dairy products form only 18 per cent of the total food of our nation and that we consume more than we produce. The truth of this statement seems to be confirmed by the statistics. In 1913, our imports of dairy products amounted to about 8½ million dollars more than our exports. In 1914, we exported 4 million pounds of butter and imported 8 million. That same year we ex-

ported 2½ million pounds of cheese and imported 64 million. Conditions have changed since then for we now find not only that our outside supply is reduced but that it has become necessary for us to ship dairy products to our allies.

Since the time of the outbreak of international hostilities in Europe, the Dairy Division of the Bureau has put forth greater efforts than ever before to stimulate domestic production and use of dairy products, and our export trade has increased as a result of the war. During the fiscal year 1916, our exports of dairy products amounted to over 24 million dollars while our imports were only about 10 million. During the fiscal year 1917, our exports increased to 49½ million dollars while our imports were reduced to about 7 million and it is expected that we will be able to considerably increase our output in 1918.

Our total annual production of dairy and creamery butter amounts to about 1,650,000,000 pounds. In the production of this butter there is left for other purposes about 33,046,000,000 pounds of skim milk and buttermilk which has a protein value equal to 10,057,000,000 pounds of beef or thirty-one times as much fresh, cured, and canned beef as we exported during the year 1916, when the export trade was stimulated by war demands. When we realize that only an infinitesimal part of this skim milk and buttermilk is consumed by human beings, and that 100 pounds of skim milk will yield an average of 15 pounds of cottage cheese which in protein value is equal to the best quality of beef steak, pound for pound, and can be sold with reasonable profit at from 4½ to 7 cents a pound wholesale, it suggests the possibility of greatly increasing the available supply of human food through the utilization of available dairy by-products. A certain amount of skim milk is necessary to feed young animals, but it has been found possible to substitute other rations except in the case of very young animals.

The Dairy Division has been engaged for some time in a campaign to increase the output of cottage cheese and create a demand and market for it. In the beginning of this campaign nine men were assigned to a certain territory for a period of three months to assist creameries and milk plants in utilizing skim milk and buttermilk in the manufacture of cottage cheese and condensed products. During that period these men were able to assist in saving for human food 15,640,000 pounds of skim milk, most of which was made into cottage cheese which had a protein value equivalent

to 3,909,000 pounds of pork. These results were encouraging and the dairy field force is being increased as much as the limited funds will permit. The Bureau has planned to keep about 20 agents in the field for an indefinite period to work in cooperation with about 50 urban demonstrators from agricultural colleges. Special attention will be given to dairy by-products work, and judging from the results thus far achieved there is every reason to believe that cottage cheese will become a more popular food substitute for meat, thus allowing the release of more meat for military and foreign consumption.

Moving Cattle from Drought Stricken Districts. The emergency appropriation has enabled the Animal Husbandry Division of the Bureau to assist in the war measures in various ways in addition to working through the regular peace-time channels. The severe drought in middle and western Texas during the past season made necessary the sale for slaughter or movement of a large number of cattle from these districts. Many of these animals were good breeding stock, and in order to save them, agents of the Bureau were stationed in the drought-stricken districts to locate, classify, and grade all females which it was necessary to market on account of the scarcity of feed. Agents were also placed in the southeastern states, especially in territory recently freed of southern cattle ticks, to locate men who had the grazing lands and feed and who wished to purchase cattle. Conservative estimates place the number of cattle moved under this arrangement at 75,000 head, of which about 80 per cent were young cows and heifers. This movement of stock has an important bearing upon our future beef supply in the saving for breeding purposes of cows and heifers which would otherwise have gone to the abattoir.

Hog Production. Pork products have a wider influence in this present world situation than one would ordinarily attribute to them and it is evident that we must increase our output to meet the demands of national stress. The hog is the most economical animal machine for converting grain and forage into meat and fat, and pork production can be accomplished with a great deal more rapidity than increased production of cattle, dairy products, or vegetable oils.

Since the beginning of the world war there has been a decrease of swine in practically all countries. After a careful study of available statistics the Food Administration concluded that in order to

meet the situation it is necessary to increase our swine production 15 per cent in 1918. To assist in producing the required increase the Bureau has placed a considerable number of special agents in the corn belt and in the southern states, and they are accomplishing even more than was anticipated.

Hog Cholera. Hog cholera undoubtedly is the greatest impediment to increasing our hog production. In 1913, the Bureau instituted experiments in three counties located in different states to demonstrate the possibility of reducing losses from that disease through farm sanitation, quarantine, and the application of anti-hog-cholera serum, properly administered by veterinarians. From these experimental efforts were developed the present control methods, which are meeting with marked success. The emergency appropriation has enabled the Bureau to extend its cooperation to 28 states and we now have a force of 140 trained veterinarians in the field working in cooperation with agricultural colleges, state regulatory authorities, and local veterinarians to further reduce the losses from hog cholera.

Data computed by the Bureau of Crop Estimates show losses of over 67½ million dollars in 1914 from hog cholera, and about 32½ million for the year ending March 3, 1917. These figures show a reduction of 50 per cent in the losses in less than four years and the field reports from Bureau inspectors indicate that losses will be further reduced during the present period. In many states the Bureau inspectors have been instrumental in bringing practicing veterinarians in closer touch with the work and with each other, and organizations were formed that have accomplished much toward bringing about a better understanding of the necessity for unified efforts and good will among the men of our profession to obtain the best possible results.

The extension of hog-cholera work as a war measure, together with the increased activities of the Dairy Division and the Animal Husbandry Division, and the rigid enforcement of the regulations promulgated under the Serum Virus Act of 1913, are producing results that no doubt will reflect favorably in producing the required 15 per cent increase in hog production in 1918.

Egg and Poultry Production. Our annual egg crop is about 1½ billion dozen. Experts estimate that about one-fifth of this crop is wasted on the farms and on the way to the consumer. If we stop to figure the food value of this waste in terms of meat we find that

the figures are astounding. The Bureau has increased its force of poultry field agents to the number of 45 in an effort to minimize the egg waste as well as increase poultry and egg production. Boys' and girls' poultry and pig club work is being pushed by Bureau organizers with greater zeal and success than ever before, with the view of further increasing the food supply.

IMPORTATION OF CATTLE FOR SLAUGHTER. Previous to the war, we did not permit the importation of cattle except from certain countries for breeding purposes. In order to help relieve the present meat situation, the Food Production Act of August 10, 1917, permits the importation of cattle for immediate slaughter from Mexico, South and Central America, and the islands in the Gulf of Mexico and the Caribbean Sea. It is expected that as soon as the construction of satisfactory abattoirs to handle the business is finished, sufficiently large importations of live cattle will be made to perceptibly increase the meat supply. In order to guard against the introduction of harmful diseases into the United States through these importations, the law prohibits importations from any country where foot-and-mouth disease exists and the animals must be handled and slaughtered under federal supervision at designated ports of entry below the southern cattle quarantine line.

IMPORTATION OF HIDES, FORAGE, ETC. In order to further guard against the introduction of diseases from foreign countries, the regulations governing the importation of hides, skins, glue stock, hair, wool, grain, and forage have been revised to make them more stringent. These regulations became effective Jonuary 1, and U. S. Government agents in foreign countries have received instructions in regard to their application.

FOOT-AND-MOUTH DISEASE. We have experienced a feeling of disquietude at the possibility of an outbreak of foot-and-mouth disease or other foreign contagious disease at this time. In preparation to meet promptly an outbreak should one occur, the Bureau submitted a tentative plan of procedure to the live stock sanitary authorities of the various states for consideration. The plan has been approved in every instance and the states have been urged to prepare promptly to cooperate with the Bureau in carrying it into effect in the event of an outbreak.

TICK ERADICATION. On July 1, 1906, 728,565 square miles of territory involving 15 states, were under quarantine for Texas Fever. It is estimated that the annual losses from this disease

amounted to $40,000,000. The movement of cattle from the quarantined territory for slaughter and other purposes was restricted by regulation, the animal population was of very inferior quality, good breeding stock could not safely be imported to improve the breeds, the dairy industry was insignificant, general agriculture was retarded through the presence of the tick, and the belief generally prevailed throughout the south that the ticks could not be exterminated.

The work of extermination was taken up in a small way in 1906. It progressed very slowly for several years owing to limited funds and opposition to the movement. After it was proved that extermination of the tick was possible and the benefits became obvious, the work progressed rapidly and up to December 1, 1917, 52 per cent of the area originally quarantined was released. In other words, through systematic efforts of the Bureau in cooperation with the state authorities and live stock owners, the cattle tick has been exterminated in an area equal to the combined areas of the New England States, the Middle States, Virginia, West Virginia, Kentucky, Ohio, Indiana, and one-third of Michigan. This should be regarded as one of the greatest achievements of live stock sanitary work that has ever been accomplished.

As soon as the emergency appropriation became available after the declaration of war, additional veterinary inspectors were assigned to duty in the tick-infested territory and the work of eradication was pushed as a war measure. There were 286 Bureau inspectors, 264 state inspectors, and 1,202 county inspectors in the field during the latter months of 1917, and 21,247 dipping vats were in operation. With the release of the entire State of Mississippi from quarantine, a wedge has been forced through to the Gulf of Mexico and during the coming season the forces of inspectors will be increased to attack the enemy from flank and rear and we may safely predict that the cattle tick will be completely exterminated in the South within the next five years. The extermination of this mischievous pest bespeaks for the South a wonderful increase in live stock production, the development of a great dairy industry, the stimulation of general agriculture, and the possibility of greater prosperity than it has ever before enjoyed.

Sheep and Cattle Scabies. A few years ago sheep and cattle scabies existed among the flocks and herds in Texas, Kansas, Nebraska, South Dakota, and all states west, and extensive outbreaks

were reported from other parts of the country. The disease became so generally prevalent and destructive that the Bureau was called upon for assistance. The infected territory was quarantined and measures inaugurated in cooperation with state authorities to eradicate the disease. Continued progress has been made since the inception of the work and at present less than two-thirds of the State of Texas and ten counties in California remain in quarantine for sheep scabies and four counties in the State of Texas for cattle scabies. Since war was declared the field work has been prosecuted with more vigor and general cooperation than ever before, and it is believed that by 1920 there will be no territory under quarantine for scabies. The eradication of this disease also has considerable bearing on increased live stock and wool production and our preparation to meet the demands that will follow the war.

Influenza or Shipping Fever of Horses. The losses resulting from influenza or shipping fever of horses have been enormous, especially among animals shipped for war purposes. The Bureau recently extended cooperation as a war measure to the officials of the War Department and state and local authorities at assembling and shipping points with the view of minimizing the losses following exposure to this disease. Employees of the Bureau are stationed at the large assembling points and market centers to inspect all horses and to accomplish the cleaning and disinfection of infected stock yards, barns, other premises, and cars used in the handling of horses. Though this work is yet in its incipiency and there are confronting problems that must receive further consideration, the results thus far obtained show that the losses from this disease can be greatly reduced.

Tuberculosis. Tuberculosis is the most widely distributed destructive disease that now menaces the live stock industry. It is estimated that the annual losses from animal tuberculosis amount to $25,000,000. Its eradication is especially important as it not only diminishes the national wealth by $25,000,000 annually but it also affects human health to a degree that cannot be measured in terms of money.

Spasmodic efforts have been made in some sections of the country to eliminate this plague, but these efforts usually have been thwarted. Much educational work has been done to prepare the way for eradication, the literature on the subject abounds in convincing statistics condemnatory of our lethargy, and yet this insidious disease continues to flourish and spread.

The additional funds provided by the War Emergency appropriation enables the Bureau to give more attention than ever before to the control of this disease. The control measures will be applied in cooperation with State authorities and live stock owners along three lines: the eradication of tuberculosis from pure-bred herds, the eradication of tuberculosis from circumscribed areas, and the eradication of tuberculosis from swine.

In the beginning, the efforts will be concentrated on the eradication of the disease from pure-bred herds. A conservative estimate of the prevalence of the disease in these herds places it at 15 per cent, and as they are the foundation of our breeding stock, an important step in eradication would be accomplished if they were freed of the disease. A plan has been put into operation for the testing of pure-bred cattle, and it is believed that with proper cooperation in carrying it into effect, in connection with the judicious application of other measures, it will have a perceptible effect in diminishing losses from this disease. It is not a measure that is being forced on the live stock industry, as the test will be administered only at the request of live stock owners when they agree to place their herds under the supervision of the Bureau and are willing to carry out instructions in regard to the disposition of reactors and the cleaning and disinfection of their premises. The object is to create a list of pure-bred herds from which persons may buy breeding stock with the assurance that they are purchasing animals for breeding purposes that are free from tuberculosis. Judging from the interest that is manifested in the undertaking and from the numerous applications for the test that are being received, there appears to be no doubt that in time there will be a sufficient number of herds placed in the accredited list to supply the demands for breeding stock.

Inspection of Meats for the Army and Navy. The military and naval forces must be supplied not only with a sufficient quantity of food but in order to maintain the health and vigor of our soldiers and sailors it must be nutritious, sound, healthful, and wholesome. The Bureau is particularly interested in the meat supply and every effort is being made to provide this kind of meat, as all purchases are made under rigid specifications, from establishments where federal meat inspection is maintained. The Bureau is cooperating with the War and Navy Departments in inspecting, selecting, and handling meats and fats for military con-

sumption and the operations are under the supervision and direction of Bureau inspectors from the time the live animals are driven to the shambles until the finished product is delivered in good condition to the cooks. In compliance with the requests of the Army and Navy Departments, Bureau inspectors are stationed at 27 different naval stations and 67 inspectors have been detailed to the various camps, cantonments, forts, and other places to make reinspections where meats and fats are delivered for immediate use.

On account of the possible addition, with malicious intent, of harmful substances to meat food products prepared for military consumption, inspectors stationed at official establishments are required to collect and forward to the meat-inspection laboratories for chemical examination, representative samples from every batch of food products prepared for the Army and Navy. The analyses of these samples is given precedence over all other work and includes an examination for adulterants and chemicals, especially poisons. Judging from the insignificance of dietetic complaints in the camps where our inspectors are stationed, it seems evident that the Bureau meat inspection service is rendering valuable assistance in this work.

I have touched upon some of the phases of the work the Bureau is doing to help in the war that is waged in the cause of democracy, justice, and permanent peace. The struggle is one which calls for rapid development and mobilization of our resources, conservation of our supplies, invincible determination and endurance, and liberal contributions of our means, our strength, and our ability in order to achieve victory as speedily as possible.

—Dr. W. L. Carson of Monrovia, Calif., has joined the B. A. I. and will be stationed in Denver, Col.

—Dr. Chas. Price of Santa Ana has joined the forces of the Dr. W. A. Connelly Co. of Los Angeles, Calif.

—Camp Kearney, San Diego County, Calif., is reported to have enough outlaw horses to start a traveling rodeo.

—Only a few cavalry horses are now being purchased in Los Angeles for the army, $125.00 being the limit price. No heavy horses are being taken, but mules are in demand.

—Dr. G. T. Purcell has been officially transferred from Lincoln, Neb., to Madison, Wis., for his duties as Veterinary Inspector.

THE SERUM TREATMENT OF HEMORRHAGIC SEPTICEMIA*

WINFRED B. MACK AND EDWARD RECORDS
University of Nevada, Reno, Nevada

Before proceeding with the presentation of this report, it will be best to make clear a few points of general interest. The title of this paper has been selected merely as a matter of convenience in the want of a better, as we do not claim that the disease under discussion is identical with that usually spoken of as hemorrhagic septicemia, due solely and primarily to infection with *Bact. bovisepticum*. It does, however, appear to be a condition which is assuming considerable importance in California, having now been reported from several widely scattered areas in that state, so that some consideration of means for its control may not be out of place at this meeting.

The data here presented are a detailed consideration of one feature of the work, a general summary of which was presented at the fifty-fourth annual meeting of the A. V. M. A. at Kansas City, in a paper entitled "Studies of an Obscure Cattle Disease in Western Nevada". For the benefit of those who have not read this paper and to refresh the memory of those who have, we will quote at this time that portion dealing with the clinical picture.

"The disease is generally enzoötic, appearing as occasional cases in the herds affected. Nevertheless the aggregate loss is considerable. Occasionally it assumes epizoötic form—in one herd ninety cases occurred among 325 head during a period of four months.

"The disease generally appears in May, reaches its height about September, and gradually subsides until January. Occasional scattering cases occur during the balance of the year. Usually the affected animals are on pasture, but a few cases occur in corrals on dry feed. While the malady is undoubtedly infectious, it does not appear directly contagious. Among beef cattle not under close observation many cases are not detected until well advanced. Among dairy herds earlier observations are possible.

"In a typical case, appetite, rumination, milk secretion, and generally bowel movements, are suddenly suspended. The animal stands apart from the herd, with its back arched and abdomen tucked up. The coat is dry, lustreless and staring. It is loath to

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move and may grunt with each step. The facial expression is distressed; the eyes have a characteristic sunken appearance.

"Respiration is rapid, of a shallow abdominal type and a grunt often accompanies each inspiration. The muzzle is dry and hot; the visible mucous membranes tinged with yellow. Generally there is a moderate rise of temperature, often to 104.0°F., seldom above 105.8°F. The pulse is increased in frequency but lacks volume and force.

"As the disease progresses, the bowels generally become loose, passages are frequent, soft, small in amount, and range from normal to almost pure blood. Urination becomes frequent and copious. There is hemoglobinuria, the color varying from light pink to that of port wine. This continues until the animal suddenly collapses and dies after a brief agonal period.

"The natural mortality is high, over 90% in cases marked enough for reasonably certain diagnosis. Those developing hemoglobinuria practically never recover.

"The duration of illness after detection ranges from a few hours to two or three days. Many animals are found dead which were never noticed sick during ordinary routine care."

Our position as to the actual cause of this condition can be well expressed by quoting the conclusions given in the paper referred to above, which were as follows:

"1. Whatever the nature of this infection, it appears to be taken up from the intestine and carried to the liver by the portal vein where it establishes itself, produces severe local damage, and later overwhelms the animal, either by extension into the blood stream or by the liberation of a soluble toxin.

"2. The original hypothesis that this is an atypical form of hemorrhagic septicemia has not been proven. The bacteriological and serological findings are rather against this theory. The clinical observations, anatomical changes and the results of immunization and serum therapy seem to favor it."

Trusting that this introduction will serve to make clear the identity of the condition we are considering, we will take up the results derived from the use of serum as a therapeutic measure.

The serum used in this work was prepared by injecting horses with increasing doses of living cultures of *Bact. bovisepticum* isolated from cattle during this investigation till their serum reached such a potency that 5 mils given intravenously would protect a rabbit against approximately 1000 fatal doses of *Bact. bovisepticum* given subcutaneously at the same time.

After a few preliminary trials, 200 mils given intravenously was adopted as the standard dose of this product. In many in-

stances this was repeated after variable periods of time till 400 or even 1000 mils had been given; but we have come to the conclusion that these supplementary doses have very little influence on the course of the disease.

The cases receiving serum treatment which we wish to summarize at this time number 140 in all and extend over a period from September, 1916, to December, 1917. All of them occurred naturally in localities where the disease is more or less prevalent. Of this 140, 60 died and 80 recovered, giving a mortality of 43%, which is very favorable by comparison with the mortality shown in past years in cases receiving no treatment or medicinal treatment along symptomatic lines under which conditions death almost invariably occurred, the mortality apparently exceeding 95%.

An interesting feature of this disease is the fact that when recovery takes place following serum treatment, it is usually prompt and complete. Long periods of convalescence are not observed and the animal returns to a very satisfactory condition as to flesh, milk flow, etc. This is perhaps remarkable in view of the extensive tissue destruction shown by cases coming to autopsy.

It may be of interest to consider the apparent effect of certain factors on the percentage of recoveries following serum treatment, as follows:

First: *Previous Vaccination.* A large proportion of the herds in which these cases occurred had been vaccinated by the following procedure: vaccine No. 1, consisting of a 48-hour bouillon culture of as many strains of *Bact. bovisepticum* as were available, mixed and killed by the addition of 1% phenol, and used in a dose of 5 mils. This was followed in ten to fourteen days by vaccine No. 2, which was a 48-hour bouillon culture of a strain of *Bact. bovisepticum* which had lost its virulenee for bovines but not for rabbits, used alive and without any attenuation in doses of 2 mils. This appeared to reduce the percentage of cases occurring as compared to untreated herds, but did not by any means eliminate the disease. Of the 140 cases treated, 94 had been vaccinated a variable time previously by the above method. Of these 57, or 61%, recovered, and 37, or 39%, died. Of the 46 cases not previously vaccinated, 23, or 50%, recovered; so that an animal vaccinated by this method apparently has an 11% better chance of recovery; but even this slight difference might not prevail if a larger series of cases were tabulated.

SECOND: *Apparent Severity of Attack as Judged by Clinical Symptoms.* Satisfactory tabulation of this phase is impossible, as where several men are carrying on work of this nature, a matter of pure judgment cannot well be standardized; but those who have treated a reasonable number of cases report that, in their opinion, there is no relation between the apparent severity of symptoms and chances for recovery. To a certain extent, the same may be said as to the time between visible onset of disease and treatment. A moderate delay in the administration of serum, while not desirable, does not seem to greatly reduce the chances for a favorable outcome, provided serum is administered before the animal passes into the final stage of collapse.

THIRD: *Amount of Serum Administered.* Of the 140 cases treated

4 received amounts from 30 up to 100 mils. Of these, 2, or 50%, recovered.
75 received amounts over 100 up to 200 mils. Of these, 46, or 61%, recovered.
13 received amounts over 200 up to 300 mils. Of these, 6, or 46%, recovered.
34 received amounts over 300 up to 400 mils. Of these, 18, or 53%, recovered.
10 received amounts over 400 up to 600 mils. Of these, 6, or 60%, recovered.
3 received amounts over 600 up to 800 mils. Of these, 2, or 67%, recovered.
1 animal received 1000 mils and died.

Hence, it would seem that doses in excess of 200 mils were of little value. If larger numbers of cases were available for summary, very likely even the slight differences in percentages of recovery as listed above would disappear to a large extent.

We do not feel satisfied as to the actual etiology of this disease and it is quite possible that the good results attained by the use of serum therapeutically is in no way due to a specific action.

This theory is strengthened by the recent work of many investigators which seems to demonstrate beyond question the remarkably good results achieved in treating acute conditions with non-specific and even normal serum. As yet we have not tried the effect of normal sera on these cases, so can express no definite opinion on this point.

As a major portion of this treatment had to be carried out in

the open under very adverse conditions as to wind and dust, some means to give the larger doses, 200 mils used intravenously, and avoid contamination had to be devised.

The following procedure was adopted: The sterile serum was put up in 200-mil bottles fitted with two glass tubes closed at the protruding end, one extending just through the stopper to serve as an outlet when the bottle was inverted; the second extending nearly to the bottom of the bottle served to admit air above the column of fluid.

Large caliber needles, 2 inches in length, were sterilized in test tubes, and about four feet of rubber tubing of caliber slipping readily over glass tube in bottles, one end fitted with slip joint to articulate with needles, was provided. This tube was wrapped in paper and autoclaved, or, in the case of men working far removed from laboratory facilities, thoroughly boiled just before use.

When ready to administer the serum, both glass tubes are deeply file marked and coated with full strength liquor cresolis comp. or similar lubricating antiseptic. The end of the outlet tube is then knocked off and the rubber tube slipped on, the peripheral end containing the slip joint adapter being left covered for the present.

The animal having been properly secured, the amount of restraint necessary varying with the strength and disposition of the subject, an area over the jugular vein is shaved and painted with tincture of iodine. The vein is then dilated by compression and the sterile needle inserted. A free flow of blood should follow.

The end is now knocked from the air inlet tube of the bottle, which is immediately inverted and held as high as possible by an assistant. As soon as the flow of serum into the tube has expelled all the air, the adapter is slipped into the needle, when the entire dose of serum readily flows into the vein. As soon as the bottle is seen to be empty, the needle is withdrawn from the vein and the operation is complete. As the puncture is so small, no steps to seal the wound are necessary.

There is, of course, nothing original in this technique. It is merely an adaptation to the rough conditions of veterinary practice of a method long used in human medicine for the administration of normal saline, salvarsan solution and other large volumes by the intravenous route.

Discussion

Dr. K. F. Meyer: At the last short course I had occasion to speak on this disease and its occurrence in this state, and I was also able to report that I had carried out some investigations into the nature of the disease.

We conducted, furthermore, to satisfy our inquiries as to the nature of the disease, some immunization experiments which were conclusive in this respect, namely, the mortality among the herds continued. Since no work has been conducted lately from our side, and I am unable to discuss from personal experience, therefore, the exceedingly interesting and valuable contribution of Dr. Records.

I will, however, outline some points which deserve perhaps some discussion from a general viewpoint of the pathology of this disease. In the first place the anatomic lesions of a marked liver infarct suggest an obstruction in the portal veins or in the arterial circulation of the liver. When I understood that I was to open this discussion I went over some of the post mortem notes of this disease and I was struck with the similarity of the lesions to those which I have observed in connection with some other experiments in other animals, and I hesitate to say that the organism entered by way of the blood stream into the liver. I think that it is not unlikely that the organism traveled up through the common duct into the gall bladder and into the biliary passages.

I would like very much to hear from Dr. Records if this is not the condition he has seen in Nevada.

Then the question of finding the bacillus is, in my opinion, not conclusive evidence that the disease is due to this particular bacillus, because in all the cases that have been isolated they were very few indeed. I have made 26 careful bacteriological examinations, and the percentage is what you found in Nevada. It is not unlikely to say that the bipolar organisms are commonly present in the lymphatic tract.

Then, another point that struck me in this paper was the treatment with immune serum and the striking results which were obtained with one inoculation. The statement that was made was definite that supplemental doses did not help the condition of the animal. I also feel that the process of cure in the animal is due to the non-specific effect as we have learned in recent years through the extensive work which has been done in the treatment of typhoid fever by the non-specific treatment with normal sera.

It is a general experience and a constant observation in experimental work that the first inoculation is one which is productive of curative effects, and Dr. Records also pointed out that the cure is remarkably rapid after the first inoculation, because of the disturbance of the colloidal condition of the blood and all of these factors are naturally provoked by the first inoculation and cease to reoccur

or cease to be developed with repeated inoculations. This is naturally contrary to our observations in specific treatment. I have particularly in mind the use of serum in bubonic plague. The more frequently the serum was applied the better the results. I should say that the treatment with horse serum is therefore non-specific in character, but I do not intend to imply that this method should not be used. I am convinced that we should make use of non-specific treatment as frequently as possible.

Rudolph Kraus has shown that he could cure anthrax in men by the use of bovine serum. For continued use of specific treatment in cattle I do not think horse serum is advisable. I contemplated some investigations in which we tried to cure a disease in cattle by the use of horse serum. We were struck by the frequent occurrence of anaphylaxis or talaxy (Novy). This particular poisoning is more frequent when horse serum is used than when cattle serum is applied intravenously. It is perhaps necessary to use bovine serum instead of horse serum.

I feel that the California problem is still open for investigation, but I am keenly gratified that Drs. Mack and Records have taken this matter up and will be only too happy to hear of their progress in reducing the exceedingly high mortality which is so heavy on certain farms.

Non-specific treatment has also been used in the treatment of entegré, which has occurred in Argentina. Lignieres reported excellent results from inoculation with animal serum, I do not recall whether it was beef serum or horse serum.

It must be pointed out that the lesions in this Sierra range disease are different from what we have seen in hemorrhagic septicemia. The presence of anaerobes in the infarct deserves special attention. I have a collaborator who is working on anaerobes and she has isolated some of these organisms in pure culture. Inasmuch as we know from the work of Bull and Pritchet of the Rockefeller Institute that death in gas gangrene is due to a soluble toxin we should not look lightly upon these anaerobes. It is not unlikely that they play an important rôle in the Sierra disease.

There are many little points which will have to be investigated, and I have only rambled here a little this afternoon to give you some of my viewpoints on the subject.

DR. EICHHORN: I personally believe that the subject of hemorrhagic septicemia is still open for further investigation. This disease is at the present time of the greatest importance from an economical standpoint, as I learned from official sources that the losses from this disease are enormous. It appears to be especially prevalent in the middle west where it is considered one of the most dreaded diseases. Of course there is a tendency to pronounce any infectious disease of cattle showing symptoms and lesions of a septicemic character as hemorrhagic septicemia.

Only a few months ago I had an opportunity to listen to a paper in which a very able man attributed the socalled corn stalk disease also to an infection with the organisms of hemorrhagic septicemia, but offered no conclusive evidence to prove his contentions and it appears to me untimely to designate this affection as hemorrhagic septicemia. Claims were set forth that the organisms isolated from cases of socalled corn stalk disease were those of the hemorrhagic septicemia type but I do not believe that the work has progressed sufficiently to justify definite claims as to its etiology which has been based only on the findings that the organisms isolated resemble those of hemorrhagic septicemia. It is not my intention to disprove the claims made, but I do believe that further work is necessary in order to establish whether there exists an identity in the etiology of these diseases.

As to the serum treatment in hemorrhagic septicemia as described by Dr. Records there is no doubt as to the substantial results he obtained. His figures show conclusively that the results have been highly satisfactory and that the treatment is worthy of adopting for animals affected with the disease.

In localities where the disease is very prevalent the only biological product being now employed both for prevention and treatment of hemorrhagic septicemia is a vaccine prepared from various strains of the *B. bipolaris septicus*. This product has been very widely advertised both by manufacturers and also by veterinarians who apparently have obtained excellent results from the same. Unfortunately there is not sufficient data available to offer conclusive proof that the good results obtained were due to the administration of the vaccine. However, it appears generally accepted by veterinarians that the vaccine is very effective for the prevention of hemorrhagic septicemia and based on these claims there has been a movement started to vaccinate all stockers and feeders shipped out from certain stock yards.

It is a recognized fact that cattle shipped from certain stock yards to farms have very frequently developed the disease either in transit or upon arrival at destination and even transmitted the disease to animals on these farms. Thus, for instance, it was claimed that shipments from the St. Paul stock yards at one season were especially subject to the disease and the investigations have proved that this condition might have been brought on by exposure to the infection in the yards together with a reduced resistance of the animals as a result of exposures to unfavorable weather conditions.

There is no doubt in my mind but veterinarians frequently make erroneous diagnosis of hemorrhagic septicemia, especially in cases where the lesions are obscure and not sufficiently definite to establish the true nature of the disease.

I should like to know from Dr. Records whether the test culture, with which he injected the rabbits, represented the same strain as used for the hyperimmunization of the cattle.

DR. LOCKETT: My personal experience with this disease is confined to clinical and post mortem cases encountered in the field.

Vaccination has apparently been beneficial in lessening the mortality of cattle on infected lands. In addition I know of a small herd of dairy cattle in which the disease has not only claimed a small annual toll in deaths but where the owners report that it is a frequent occurrence for one or two cows to suddenly go off in milk production for no apparent cause. In such instances they appear sick from some mild digestive disturbance and are very slow in recovering. Their milk yield in most cases after these attacks never returns to normal. After vaccination of this herd the owners reported that such occurrences in the herd practically ceased and they feel that in some way or other the vaccination is responsible for the improvement.

DR. GEORGE SMITH: Practically unknown in Oregon. Very few cases reported.

DR. F. H. BAKER: I can only discuss this matter from a practitioner's standpoint. Stockmen in our valley have been helped greatly by the administration of the vaccine and serum treatments. People on the large ranches who have lost a large number of stock have had their losses greatly reduced, and the feeling in the community is that they have been greatly helped.

In regard to the administration of serum to range animals, they are simply side lined against the fence, the attendant pinches the animal's nose, and the fight is over.

DR. RECORDS: I do not think there is very much to add to what has already been said, but possibly I did not make it as clear as I should the extreme doubt we feel as to the cause of this disease. Dr. Meyer's remarks put our attitude mildly. I have lost all the feeling that I did have that this condition is primarily due to *Bact. bovisepticum*. I think what Dr. Meyer said about the portal of entry to the liver is a very feasible theory. It might be that flukes in the smaller bile ducts produce a local irritation which could possibly dam off the bile duct and make an area of bile congestion.

Another thing that strengthens the theory that this is not true hemorrhagic septicemia is the fact that in one locality where this disease has caused very severe losses and where anthrax is also present, the men in charge, though they are not veterinarians, have kept a check on the anthrax situation by taking blood swabs from carcasses. One time they sent down a blood swab and it was very rich in *Bact. bovisepticum*. That would look as though it were a case of true bacteremic type of hemorrhagic septicemia. I have just heard since coming to Davis, through Dr. Hays and Dr. Dobbs, that they had a true case showing bacteremia and general hemorrhagic lesions, and that is becoming fairly frequent in California. I think Dr. Meyer is right as to the possibility of the anaerobe fac-

tor here. Possibly if we could reproduce the proper conditions we could reproduce the disease.

Answering Dr. Eichhorn's question, we used for hyperimmunizing the horses as many strains of *Bact. bovisepticum* as we could obtain by isolation and a few from outside sources; even strains of *Bact. avisepticum* were used to some extent. The strain used for standardizing the serum is the one we use for our No. 2 vaccine. It also enters into the hyperimmunizing of the horses.

DR. ROSENBURG: To what extent do you find this disease among sheep in Nevada?

DR. RECORDS: We had one small outbreak of what we suspected to be hemorrhagic septicemia in the sheep on the University Farm. *Bact. ovosepticum* was isolated from the kidney of one of these animals. The diagnosis was rather weakened by the lesions being mostly in the anterior half of the bodies. In our work with sheep, we found that we could produce this appearance with some forms of plant poisoning and with potash poisoning; and plant poisoning is fairly frequent with us. Some of our plants in certain stages are very dangerous to sheep owing to the high potash content.

DR. MEYER: Some cultures were sent to me for identification. The letter stated that these animals had died some three or four weeks after they had been vaccinated. They were sent to me with the request to verify if they were *B. bovisepticus.*

DR. L. M. HEARD: The lesions were more indicative of anthrax than they were of hemorrhagic septicemia. We vaccinated that herd for anthrax, and the lesions did not afford any culture of anthrax organism, so it left the question open as to what killed the cattle. There have been quite a few others in the county which looked very much like hemorrhagic septicemia, some including the liver lesions, a great many showing typical lesions throughout the lungs. We have not been able to get a culture which looked anything like the bovisepticus. The cases are very similar, they act quickly, die quickly, or recover quickly.

—Dr. A. J. Burley, who has been engaged in field work on sheep scab, has been transferred to Buffalo, N. Y.

—Dr. Warren D. Livermore has moved from Delavan to 2010 Prairie Ave., Chicago, Ill.

—Miss Anna J. Edman and Dr. George S. Jordan were married January 18, at Williamstown, Mass.

—Dr. H. H. Bair has removed from Lawrenceville to Trenton, N. J.

STUDIES ON TREMBLES OR MILKSICKNESS AND WHITE SNAKE ROOT*

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B. F. Kaupp, Pathologist
From the North Carolina Experiment Station

Historical. For the past two years our attention has been directed to a disease of domestic animals, including horses, cattle, sheep, and hogs, which is commonly called trembles. This disease is transmissible to man through the milk of animals affected with trembles and is, therefore, termed by physicians, milk sickness. This disease has been known within North Carolina since the days of the American Revolution. Furthermore, it has been known to be endemic within Tennessee, Kentucky, Ohio, Indiana, Illinois, Missouri, and Georgia, since their first settlement. Within North Carolina the disease is confined to the mountainous section, and in the other states it appears to be confined, at present, to the more remote areas. The first published account of this disease, which consisted of a concise statement of the symptoms, kinds of animals affected, conditions favoring its prevalence, and the remedial and palliative measures, was published in 1810. Numerous articles bearing on some phase of the disease have appeared subsequently, most of which were written by physicians.

Etiology. Considerable confusion exists as evidenced by published accounts regarding the cause of trembles or milksickness. In general these etiological factors may be placed in one of three groups: mineral, bacterial, and poisonous plants.

The Mineral Theory. Several minerals, including arsenic, copper, mercury, cobalt, lead, and aluminum, have been held to be responsible for the disease. These claims are not supported by any considerable amount of experimentation and in the work which was most carefully done no condition remotely resembling trembles resulted.

The Bacterial Theory. Several factors have contributed to induce students of trembles to believe in the bacterial theory. This is instanced by the fact that several outbreaks have been attributed to the use of water either from streams in sections where milk

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sickness prevails or from wells, and because it has been generally believed, for a long time, that milk is an agency of transmission. The only accounts which have recorded studies upon a definite microscopic organism are those of Jordan and Harris, and Luckhardt. These authors ascribe the disease to a spore forming organism which they call *Bacillus lactimorbi*. In summarizing their own experiments they conclude that the facts do not indicate that a specific organism is the cause of milksickness. However, one of them has incorporated in his recent text book on bacteriology an account of this disease attributing the cause to this bacillus, and many investigators have accepted the conclusion that *Bacillus lactimorbi* is the causative microorganism.

THE POISONOUS PLANT THEORY. The adherents to the poisonous plant theory have based their belief upon two observations which are universally in accord. The first of these is that when the natural vegetation of milk sick tracts is replaced by cultivated plants the disease disappears, and the second that the disease is limited to the season when animals are allowed to graze. About a dozen species of flowering plants have by various workers been held to be the cause of trembles. Among these plants white snake root, *Eupatorium urticaefolium*, has been more commonly held to be responsible than any of the other species. No one seems to have advanced any considerable body of experimental data in support of this belief. However, the opinion was expressed as long ago as 1840 that this weed was the cause of the disease, and as recently as 1906 several papers by Moseley affirm that trembles follows the feeding of white snake root. Moseley's results were discredited by Crawford, who, in 1908, as a result of experiments with this weed, concluded that milksickness is not due to any constituent of white snake root. The experiments of the present writers accord with those of Moseley in showing that white snake root will produce trembles.

SYMPTOMATOLOGY. The accounts previous to the present studies describe the symptoms with no degree of fullness except in the case of the disorder in cattle. These animals are at first listless and disinclined to move. If they are driven they walk slower than normal animals and falter in their gait. At this stage there is a marked stiffness of the joints and a characteristic trembling. The animals are inclined to sink to the ground manifesting great exhaustion and unless they are disturbed will remain lying

for hours or days on the spot where they have fallen. One peculiar feature of the disease is that acute symptoms are developed following violent exercise. Prospective buyers of cattle from milk sick areas make use of this fact and drive the cattle until they are heated before buying them.

The first sign of the disease in sheep is a loss of appetite. They are sluggish, frequently grit their teeth, and remain standing in a droopy posture, or in a recumbent position. Early in the course of the disease a marked stiffness of the legs may be noted which becomes progressively more aggravated. At this stage the animal refuses to move and stands with the hind limbs placed well under the body and all feet spread apart laterally. In this position the back is arched, the neck outstretched and the head lowered. The quivering is first seen in the limbs whence it spreads over the entire body, increases in intensity and becomes in a few seconds a violent involitional tremor. At this stage of trembling the animal quickly drops to a resting position and the trembling immediately ceases. If the animal is made to rise a second spasm immediately ensues, and trembling may repeatedly recur every time the animal is placed on its feet.

The symptoms of trembles in hogs begin by a listlessness, not accompanied by a loss of appetite. When food is offered, the animal arises and its movements indicate a marked stiffness of the limbs. After it has eaten at the trough for a few minutes a slight quivering of the legs is evidenced. This becomes progressively more severe, spreads over the entire body and becomes a violent shaking. The animal then either falls to its knees or sits upon its haunches from which position, after a moment, it falls into a resting posture. Trembling continues for a few moments after the animal has lain down.

Morbid Anatomy. Externally the bodies of animals dead of trembles present nothing on inspection that is worthy of note. Upon opening the thoracic cavity there is found to be present a small quantity of clear yellow fluid. The lungs do not collapse. A quantity of frothy fluid exudes from the sectioned surface of the lungs. Generally the pericardial sac contains varying quantities of clear straw colored fluid which coagulates upon exposure to the air. Numerous ecchymotic areas are present, especially at the base of the heart along the cardiac veins. The heart muscle contains fatty areas or streaks and has undergone cloudy swelling.

Upon opening the abdominal cavity there is no apparent abnormal quantity of serous fluid. The liver is soft and friable and of the nutmeg appearance. When sectioned, blood drips freely from the sectioned surface. A considerable amount of fatty degeneration has occurred accompanied also by cloudy swelling. The kidneys are of a metallic appearance and have undergone parenchymatous degenerative changes. The small intestine shows muco-enteritis. The brain is congested. The bladder may be injected and the urine highly colored, either cloudy or of a port wine color.

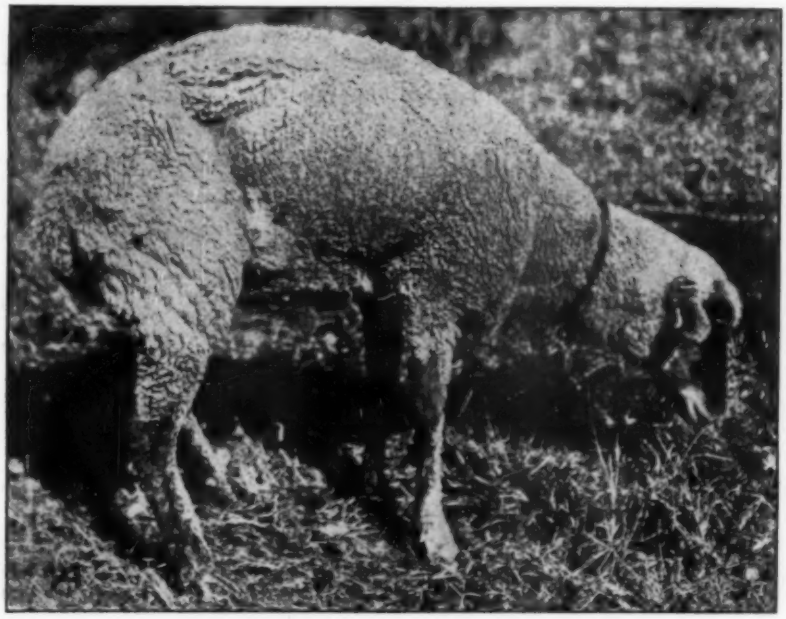

FIG. 1. A sheep affected with Trembles or rich weed poisoning

Upon microscopic examination the most profound changes are found to occur in the heart, liver, and kidneys. In the heart these changes consist of cloudy swelling and fatty degeneration. In the liver the parenchymatous cells are swollen and there is more or less fatty metamorphosis. The kidneys show hyperemia, glomerulitis, and parenchymatous degeneration.

RESULTS OF EXPERIMENTS WITH WHITE SNAKE ROOT. In the experimental work sheep, suckling lambs, hogs, dogs and guinea pigs were used. The sheep, hogs, and guinea pigs were given varying quantities of white snake root or products prepared from this

plant. Along with this was fed a maintenance ration of some dry concentrate. The suckling lambs were given kale and grain in addition to the milk which they took from their mothers. The dogs subsisted mainly upon the carcasses of sheep and lambs dead of the disease. All animals used in the experiments were in normal health.

Since white snake root does not grow in the vicinity of Raleigh where the feeding experiments were conducted arrangements were made whereby daily shipments of green plants could be secured from Shooting Creek, North Carolina, a point about 400 miles distant. Since the animals did not eat readily of the green weed it was passed through an ensilage cutter and was mixed with grain before being fed.

FIG. 2. A sheep affected with Trembles or rich weed poisoning

During the two years in which white snake root was fed, a total of 41 sheep and lambs were subjected to experimental conditions. Thirty-one of these died and all except two were observed to be characteristically affected with trembles or milk sickness. These two were infested with stomach worms, *Hemonchus contortus*, which infestation may have been a contributory cause of their death. Two of these 31 animals were lambs which contracted milk sickness from the milk of ewes feeding upon white snake root. The mothers of these lambs were apparently normal when the lambs developed typical symptoms of the disease and died.

One of the two hogs which were fed upon white snake root developed a fatal case of trembles whereas the other remained apparently unaffected.

Seven dogs ate of the flesh of sheep dead of trembles with manifestly no ill effects.

Twenty-nine guinea pigs, 15 of which succumbed in the experiment, were given white snake root or various extracts prepared from this plant.

Varieties of White Snake Root. The genus to which white snake root belongs is represented in the southern United States by about 40 species. Some of these can be distinguished from white snake root only by the exercise of care in making the determinations and by one who has had experience in identifying plants. This accounts for the fact that farmers, on being shown white snake root and told that it is the cause of trembles, not infrequently maintain that their stock graze upon the plant without ill effect. Only one of these 40 species is known to be poisonous yet several of the others possess medicinal qualities. The difficulty of distinguishing between species of *Eupatorium* may be illustrated by comparing *Eupatorium incarnatum* which differs from white snake root only in the possession of hairs on the corolla tube. Since the flowers are small this character cannot be seen without the aid of a hand lens.

Course and Termination. Considerable individual variation exists both in the period elapsing between the time that feeding is first given and initial symptoms of trembles are apparent and in the period following until death ensues. Some are sick as early as three days after being fed on the weed whereas no ill effect are apparent in others until ten or twelve weeks have elapsed. Animals usually live three or four days after the disorder is first noticed although some have been observed to die within twelve hours. Relatively few domestic animals characteristically affected recover. Only one of our 31 cases recovered and this one succumbed to a second attack the following year.

Summary of Lesions. Special attention was given in this work to the pathological anatomy of animals affected with trembles. The results can best be presented by tabulating the findings from 16 representative cases.

	No.	Per Cent
Gross		
Petechiae, epicardium	13	81
Pale heart muscle	3	18
Muco-enteritis, small intestine	12	75
Active and passive congestion, kidney	15	93
Cloudy swelling, kidneys	15	93
Congestion of the brain and meninges	6	37
Lungs do not collapse, slight edema	5	31
Congestion, liver	12	75
Cloudy swelling, liver	12	75
Hypopericardium	4	25
Microscopic		
Liver		
Active congestion	9	56
Passive congestion	8	50
Cloudy swelling	13	81
Fatty degeneration	14	87
Kidneys		
Active congestion	8	50
Passive congestion	7	43
Cloudy swelling	16	100
Glomerulitis	9	56
Fatty degeneration	5	31
Brain		
Congestion	8	50
Heart		
Fatty degeneration	5	31
Congestion	4	25
Lungs		
Hyperemia	5	31
Edema	4	25
Duodenum		
Muco-enteritis	12	75

Culture Studies. Cultures were made from the livers, hearts, and kidneys of six sheep and lambs and one hog dead of the disease. All of these cultures were negative. Furthermore, an attempted isolation of a specific organism from the internal organs of a guinea pig dead of the disease was negative.

Treatment. Prophylactic or preventive rather than curative measures are to be employed in dealing with trembles or milk sickness in districts where the disease is prevalent. Early settlers found that by keeping their animals from pasturing on certain lands or by cutting down the timber and exposing the land to sun-

light that they could avoid the disease. They furthermore found that by ploughing dangerous areas and seeding them to cultivated forage plants, they could render them safe for their stock. The employment of either of these preventive measures is, in some localities, practicable under North Carolina conditions. Where the timbered lands are under the control of timber companies, it would not be feasible to clear them, and furthermore, it would in many places not be advisable to do so on account of the value of the timber. If it is possible to clear the land it should be done, since white snake root is intolerant to direct sunlight. Areas occupied by this weed might in some cases be fenced off, some of them might be mown during the growing season or might even be ploughed up. Since the weed is perennial rooted, a single mowing off of the tops or even a single ploughing would not destroy all the plants. The destruction of at most a few acres of white snake root will, in many large pastures, render an otherwise dangerous pasture harmless.

Various forms of treatment have been suggested for animals suffering from the disease but the nature of the changes within the internal organs are such as to extend little hope that beneficial results can follow medication. Veterinarians have employed such drugs as eserin, various internal antiseptics and nerve stimulants but without consistent remedial effects. Some have relied upon large doses of bicarbonate of soda to effect a cure.

At the annual meeting of the Southern Auxiliary California State Veterinary Medical Association the following officers were elected for the ensuing year:

L. M. Hurt, Pasadena, president; W. G. Oliver, San Diego, vice president; W. E. Phelps, Redlands, treasurer; and J. A. Dell, Los Angeles, secretary. J. A. DELL, Secretary.

—Dr. H. E. Kemper, formerly at Santa Fe, is now located at Albuquerque, N. M.

—Dr. Robert Boyd has removed from Modesto to San Francisco, Calif.

—Dr. A. H. Legenhauser, formerly at Weldon, Ill., is now in the service of the Bureau of Animal Industry at Chicago, Ill.

—Dr. H. C. Johnson has removed from Linden, Ia., to Portland, Oregon.

THE REGULATION OF THE MANUFACTURE AND SALE OF VETERINARY BIOLOGIC PRODUCTS BY THE BUREAU OF ANIMAL INDUSTRY*

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The regulatory work of the Bureau of Animal Industry with reference to the preparation and sale of veterinary biologic products is done under authority of an act of Congress approved March 4, 1913 (37 Stat., 832), and under regulations of the Secretary of Agriculture made under authority of the same act. The act and regulations provide that the Secretary of Agriculture shall issue permits for importation of biologic products from abroad, and licenses for the preparation, sale, and interstate shipment of those of domestic manufacture which possess certain qualities. Products included under the regulations comprise all viruses, serums, toxins, and analagous products, such as antitoxins, vaccines, tuberculin, mallein, microorganisms, killed microorganisms, and products of microorganisms, which are prepared for use in treating domestic animals.

The regulatory work is administered in the Bureau through a separate Office of Virus-Serum Control which is responsible to the Chief of the Bureau and not connected with any other division of the Bureau. However, the Biochemic and Pathological Divisions cooperate closely with the Office of Virus-Serum Control in matters concerning the purity and potency of products and methods of manufacture. The Office of Virus-Serum Control has under its supervision a force of 95 employees whose activities are devoted exclusively to the work in question. Of these employees 64 are veterinarians, 8 are engaged in clerical work, and 23 are lay assistants. The field force is organized into 20 stations and 17 substations, located in 14 states at points convenient of access to manufacturing plants. For the fiscal year 1917 a total of $186,200 was allotted to the control of the manufacture, importation, and shipment of viruses, etc.

VARIETY OF PRODUCTS. The business of preparing biologic products has expanded greatly since the inception of the regula-

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tory work in 1913. During the calendar year beginning January 1, 1914, 84 firms were licensed to prepare antihog-cholera serum and hog-cholera virus, and 4 of these licenses were revoked during the year. Four of the firms licensed for hog-cholera products produced in addition 28 other products, while 17 firms not engaged in producing hog-cholera products were licensed for 84 products. Thus 112 products other than those for hog-cholera were being prepared.

During the present calendar year up to July 6, 1917, 67 licenses were issued to establishments preparing hog-cholera products, 2 of which have been revoked. Seven firms licensed for hog-cholera products also produce 89 other products. Twenty firms not licensed for hog-cholera products are producing 143 other products. Altogether 232 products not concerning hog-cholera are being manufactured under licenses at present. In referring to the number of products on the market, it should be noted that they are not designated as different products. This and similar totals throughout this paper refer to the aggregate number of products manufactured by all the licensed plants, many of which make the same product, thus causing some to be counted more than once.

By comparing the current period of slightly over a half year with the full calendar year of 1914, it will be observed that the number of miscellaneous biologic products has more than doubled since 1914. These products represent a wide variety of methods of manufacture and the increase in their number has complicated and increased the regulatory work.

Two firms hold permits for the importation of veterinary biologic products. Twenty imported products are represented, prepared by 8 different foreign laboratories.

The United States veterinary licenses and permits in force on July 6, 1917, cover 377 products. This total represents the number of products for which licenses are issued but does not represent the total number of different forms in which products are marketed. For example, the Bureau upon application permits a firm licensed for tuberculin to market packages of tuberculin in various forms for use in the subcutaneous, intradermal, and ophthalmic tests. The same is true of mallein. Blackleg vaccine may be marketed as a powder for single or double injections, in the pellet form, or as strings. Bacterial vaccines may be marketed in

single dose ampules, in serial doses, in bulk containers, or in tablet form. These and other considerations, such as size of package, greatly augment the list of products as advertised for sale by the manufacturers.

The products prepared and distributed under the United States veterinary license represent a wide variety of agents designed to immunize against infections, cure disease, or to be used in diagnosis.

Antihog-cholera serum is the one most extensively manufactured. The method of preparation differs from that used in making other antisera in that the virus injected into the serum-producing animal is in the form of virulent blood.

Other antisera, produced in a somewhat different manner, constitute a considerable variety of products. In these latter, an animal receives successive and increasing doses of live or dead organisms for the purpose of producing antibodies in the animal used for serum production which will be specific for the organism injected. In the manufacture it is necessary to use the organisms themselves, for they do not produce any considerable amount of toxin in cultures as do the tetanus and diphtheria organisms. Some are recommended for use as a prophylactic, either alone, or in a serum-simultaneous treatment, or alone as a therapeutic agent.

Antiblackleg and antistreptococcic serums are prepared by six manufacturers, anticanine-distemper serum by five establishments, while antianthrax, antiwhite-scours, and antiinfluenza serums are prepared by four concerns. Other serums prepared by one establishment each are antisera for septic pneumonia, equine abortion, bovine abortion, fowl cholera, and hemorrhagic septicemia.

Another class of serums differing in the method of manufacture is represented in veterinary practice only by tetanus antitoxin for which 12 firms hold licenses. The characteristic feature of its preparation is the injection of the serum-producing animal with tetanus toxin, which is derived from cultures of the tetanus organism, but which contains no organisms when injected. This characteristic of the tetanus organism of producing a strong toxin in culture, is responsible for the high potency of the antitoxin, and for the accurate method of standardization used in testing it.

Another serum product, normal serum, is marketed by two establishments and recommended for both subcutaneous and in-

travenous injections and local use on wounds for preventing and arresting hemorrhage. The normal serum of various domestic animals is supplied so that a homologous serum is available for a patient, to avoid danger of anaphylaxis.

Of the nonattenuated viruses marketed, hog-cholera virus is prepared by 67 firms, while blackleg virus is marketed by 2 concerns. Both are used in connection with serum in the serum-simultaneous system of immunization.

Products containing bacteria attenuated in virulence are represented by blackleg vaccine prepared by 9 firms from heated, powdered, infected muscle. Two firms supply the attenuated blackleg organism in a suspension in fluid. Attenuated anthrax organisms are prepared by 6 firms, 4 under the name of anthrax vaccine and 2 as anthrax spore vaccine, the latter for use with antianthrax serum.

Blackleg aggressin prepared by 5 firms constitutes a comparatively new product for producing immunity against blackleg. It consists of a sterile liquid obtained by extracting the fluid from blackleg lesions and filtering. Another firm prepares a sterile product from blackleg culture filtrates for the purpose of inducing immunity.

Antirabic virus, sometimes designated rabies vaccine, represents a still different method of inducing immunity. The process of drying the spinal cord of the infected rabbit used in the Pasteur method, employed by four concerns, is by some regarded as a process of attenuation of the virus. Others believe that the process merely kills off virus proportionate to the length of drying and thereby dilutes it to such a degree that a given dose is not capable of transmitting the disease, while quite capable of inducing immunity. Another product prepared by the Högyes method by one firm consists of serial dilution of fixed virus, while still another product is prepared after the Harris method by one laboratory.

Diagnostic agents prepared under license include tuberculin manufactured by 11 establishments, mallein by 9, and abortin by 2 laboratories.

Bacterial vaccines, often designated bacterins, constitute a wide variety of products. They consist of either suspensions of bacteria in normal salt solution or suspensions of bacteria in the culture medium in which they were grown, but in either case killed by the application of heat, or by the use of disinfectants and pre-

pared aseptically. All contain a slight amount of preservative and all are standardized with respect to the number of organisms present in a given volume. The word vaccine has gained a rather broad meaning, and in the case of the products in question does not signify an attenuated culture as it does in the case of blackleg and anthrax vaccines.

Bacterial vaccines may be classified into stock vaccines, which are made up without reference to the particular strain of organisms present in the animal to be treated, and autogenic vaccines, which are made to order with cultures obtained from pus or exudates collected from the particular case to be treated. Bacterial vaccines are used for prophylactic and curative purposes.

The constituent organisms may consist of well-recognized primary etiological agents alone, as in the product for bovine abortion, or mixtures of various organisms occurring in lesions, as in the products for canine distemper and navel ill, some or all of which organisms may be secondary invaders.

One hundred and forty-two bacterial vaccines are on the market. About half are named for the diseases against which it is recommended that they be employed. For equine influenza there are 18 products, for canine distemper 13, for hemorrhagic septicemia 11, for bovine abortion 8, for navel ill 6, for calf scours 6, for streptococcus mastitis 4, for swine plague and equine pneumonia 2 each, and for equine abortion and fowl cholera 1 each.

Under the designations of mixed and polyvalent vaccines, there are 29 products containing mixtures of two or more common suppurative organisms such as streptococci, the various staphylococci, colon bacilli, and the like.

A number of products are marketed which contain one organism each, such as streptococcus vaccine, 12 products; colon vaccine, 8; staphylococcus, 6; pneumococcus and *Baccillus abortus,* 3 each.

Eight firms hold license for preparing autogenic vaccines.

Another class of products consist of bacterial vaccines containing organisms that have been brought in contact for a limited time with an immune serum drawn from an animal previously injected with cultures of the same organism. Four such products are under license.

Another sort of product represented by three examples on the market consists of filtrates of cultures.

A live culture of *Bacillus bulgaricus* is marketed by one establishment and recommended for correcting intestinal conditions.

PURPOSES OF THE REGULATORY WORK. The purposes of the regulatory activities under consideration are defined in the act of Congress and in the regulations covering the subject. The act prohibits the sale and interstate shipment of any worthless, contaminated, dangerous, or harmful virus, serum, toxin, or analogous product intended for the treatment of domestic animals. No virus, serum, toxin, or analogous product intended for a like use shall be prepared and shipped interstate except under authority of a license of the Secretary of Agriculture, and unless it has been prepared in compliance with regulations prescribed by the Secretary of Agriculture. The law provides that these regulations shall be designed to prevent the preparation and sale of harmful viruses, serums, toxins, or analogous products. Authority is provided for suspension and revocation of a license after a hearing. Similar provision is made for the control of the importation of biologic products.

A summary of the provisions contained in the regulations can hardly be presented here, but it may be noted that a license for the manufacture of a product is given only after a searching inspection is made of the establishment and the methods of manufacture. In view of the large and varied number of products prepared, the duties required by the law and the regulations constitute a task of considerable magnitude. Moreover, the field of biologic prophylaxis and therapeusis is constantly broadening, and consequently presenting new problems in connection with regulation.

SANITARY AND OTHER REQUIREMENTS. In making inspections previous to the issuance of a license cognizance is taken of the construction and sanitation of the establishment with reference to such points as number, size, condition, and purpose of rooms provided, light, ventilation, drainage, disposal of refuse, facilities for storage of product and general sanitary condition. Cognizance is also taken of the integrity and qualifications of the applicant and of the person in charge of the preparation of the products.

The danger of contamination of products by pathogenic organisms has to be kept in mind when an establishment handles such dangerous organisms as the tetanus, anthrax, and blackleg bacilli and hog-cholera virus. This necessitates proper segrega-

tion of laboratories, equipment, and stables in which these organisms are handled, together with the institution of measures to secure a safe disposal of refuse. This last problem concerns not only the health of other animals in the establishment, but also the safety of other animals in the vicinity.

The general equipment of the establishment is inspected with reference to the presence of the amount of apparatus, glassware, chemicals, etc., necessary properly to produce the sort of products for which license is desired. Facilities available for washing, also sterilizing, together with character of quarters for care of experimental animals, are taken into consideration.

The source from which laboratories obtain large animals for serum production, and their state of health is a matter of concern to the Bureau. Firms should procure only normal animals for the production of biologics in order properly to safeguard the live stock industry of the country. The widespread shipment of a virus like that of foot-and-mouth disease inadvertently allowed to contaminate a biologic product is a calamity that must constantly be guarded against.

Since the preparation of veterinary biological products has developed to such a great extent, a word may properly be said concerning the relative efficiency of the products.

It is well recognized by those who have observed the results following the administration of products intended for diagnostic, prophylactic or therapeutic purposes, that it is now possible to classify them into two general classes, namely: products whose reliability and worth have been established; and products, while worthy of a trial, cannot be depended upon as in the case of class 1.

To class 1 belong such products as tuberculin and mallein prepared for diagnostic purposes; antitetanic serum, antihog-cholera serum, blackleg vaccine, and other products prepared for prophylactic and therapeutic use. It has been demonstrated beyond all question that, when properly prepared and administered, these products will accomplish the purpose for which they are intended. There are tests whereby their potency may be determined, and such tests should be made after each batch of product prepared. In the case of tetanus antitoxin titration may be made against the toxin and the units of antitoxin accurately determined. In the case of testing such products as antihog-cholera serum, we have tests which may be relied upon to demonstrate whether or not the

product is potent and, therefore, dependable, but the degree of potency cannot be determined with the scientific accuracy as is the case in testing the potency of tetanus antitoxin.

The second class is comprised of such products as the various bacterial vaccines for the treatment and prevention of such diseases as shipping fever, canine distemper, pneumonia, swine plague, abortion, etc. These products are prepared from stock cultures maintained by the manufacturer. They are worth trying, but experience has not shown that satisfactory results will follow their administration with the same regularity as has been described in the case of products under class 1. In the claims made on the labels and advertising matter of products of class 2, manufacturers should be very conservative concerning the beneficial results which may be expected following their use.

LABELING. The method of labeling is considered highly important in connection with establishing the identity and age of a product. The label of the immediate or true container of the product is required to bear the true name of the product and the number of the veterinary license granted to the establishment. The same label bears a date after which the product is not recommended to be used, and also a serial number. This number identifies the particular sample with reference to manufacturing methods. Thus, if a given product is found to be unsatisfactory or dangerous on laboratory examination or upon use in the field the label furnishes information permitting the identification of the rest of the lot. It is insisted upon that the information in question appear upon the immediate container, for oftentimes cartons are destroyed and an unused container may thus be the only evidence left by which the particular lot of product may be identified.

METHODS OF MANUFACTURE. The inspection of methods of manufacture is made as searching as possible. In the case of a bacterial vaccine, for instance, information collected includes the species of organism entering into the product, number of strains employed and relative proportions in which each is present; source of cultures, details of cultivation, method of standardization, sterility tests and general aseptic precautions, dosage, for what conditions recommended, and circular matter put out with the product.

Inspection with reference to the manufacture of a serum product takes into consideration the animals used in the preparation of the product, their age and condition, use of tuberculin and mal-

lein tests on the animals, prophylactic use of tetanus antitoxin on same, routine observation of temperatures of the animals, character and purity of material injected, all data regarding frequency of injection and of bleedings, methods of recovering serum, all manipulations of same, standardization and purity tests, dosages, and conditions under which use of product is advised.

GUARDING AGAINST CONTAMINATION. The Bureau insists that all products required to be sterile when marketed shall be thoroughly tested for sterility before being sold. The inspection of a laboratory includes close scrutiny of the precautions taken by the laboratory in this connection. The method commonly employed consists in seeding two fermentation tubes of glucose (dextrose) bouillon with 5 drops and 20 drops, respectively, from each sample tested. These are incubated for seven days and observed for evidence of growth of contaminating organisms. If the number of containers filled from the lot is less than 100, three are opened and tested. If more than 100 containers are filled at one time, 3 per cent of the containers are tested. The discovery of contamination in the product of a reliable establishment is regarded as a very serious occurrence, besides the waste of labor involved in preparing a product that cannot be marketed. Consequently, check sterility tests are made after every manipulation that could possibly result in contamination. The larger establishments maintain a testing department in which samples are restested after being tested in the producing department.

Contamination is the great obstacle encountered by the commercial bacteriologist. A man with a mere smattering of bacteriology or one fairly well trained in ordinary laboratory technic knows little of these difficulties. Unless a bacteriologist has had experience in preparing products commercially he will meet difficulties at every turn. It is one thing to cultivate bacteria in test tubes and keep the cultures pure, but quite a different matter to cultivate bacteria in commercial quantities, make the necessary transfers of large quantities of suspension, and keep the product sterile.

The Bureau is requiring that precautions be taken to insure that cultures employed in making products be true to name and free from contamination. Periodic tests of cultures for identity and purity are made in licensed laboratories, and permanent records of the same are kept. Besides these records the laboratory

should have a set of records showing the animal from which the culture was obtained, the nature of the lesion, and the date when isolated. There is a general belief that stock vaccines for a given condition should be made from cultures obtained from a similar lesion in the same species. There is a general tendency to use freshly isolated cultures with the idea that they will be more effective. The desire to secure polyvalency necessitates securing many strains of the same organism. Some firms use at least 10 strains of the same organism in the preparation of products, and others still more. All these considerations lead to the accumulation of a larger number of cultures than is indicated by the number of vaccines marketed. The Bureau frequently requests applicants for license to submit sample cultures of the organisms to be used in preparing the products. In some instances, contaminated, misnamed cultures have been sent in response to the request and these have furnished the most convincing sort of evidence regarding the standing of the laboratory.

Laboratory Records. Laboratory records are required to show every essential fact in connection with the preparation of the product beginning with the names or numbers of the cultures employed and ending with the record of the last sterility test. A properly kept record system is essential in order to trace the identity of a number of products carried through a complicated set of processes and tests. For vaccines it will include numbers of the individual strains used, date of inoculation, kind of medium used, period of incubation, date of harvesting, examination of character of growth, volume of saline suspension, extent of heating and date, amount of preservation with date and result, date filtered, and volume after filtering. Data concerning count to include date, number of trials, dilution of the fluid counted, organisms per square of the counting chamber, average count, and calculated number of billion organisms per cubic centimeter, sterility tests, date, and result; data regarding dilution record to include laboratory number of suspension, new laboratory number assigned to the dilution, date, volume of original suspension used, and volume of same left.

This much constitutes a record of the dilution of the original suspension. However, similar data will be recorded for a number of further dilutions necessary for the preparation of a vaccine put out in serial dosage. For instance, a bacterial vaccine may be composed of a mixture of suspensions in the proportion of staphylo-

cocci 70 per cent, streptococci 20 per cent, and colon 10 per cent. This will be diluted to make six 2 c.c. doses of 1,000, 2,000, 4,000, 6,000, 8,000, and 10,000 million bacteria, respectively. In addition to the data mentioned, the record of each dilution will bear the names of the individuals who performed the operations and of those responsible for check observations and tests.

The filling record will furnish data concerning laboratory numbers, name of product, date filled, number of containers filled, kind of container, person doing filling, person doing stoppering, room in which done, number of containers tested, date fermentation tubes were planted, by whom planted, date of examination of incubated fermentation tubes, date examined, by whom examined, a tabulation of results of observations on fermentation tubes, and the name of the person checking the observations.

It must be evident that such a set of records will fix responsibility in case errors are committed. It will also be noted that the preparation of a mixed bacterial vaccine is a complex matter.

Sampling Suspected Products. From time to time samples of suspected products are bought on the open market under conditions which prevent the establishment from knowing their destination. Samples obtained under such conditions furnish valuable information regarding the compliance of laboratories with the regulations concerning the stamping of labels with serial numbers and return date. These samples are all tested for sterility and when reliable laboratory methods are available, are tested for potency. During the year June 30, 1916, to July 1, 1917, 281 samples were bought on the open market and tested. Of these, 21 samples, representing 12 products made by 8 establishments, were found to be unsatisfactory.

Some Results of the Work. As has been stated, antihog-cholera serum is more extensively manufactured than any of the other products coming within the scope of the Virus, Serum, and Toxin Act of 1913. The Bureau reports show that during the past calendar year 222,786,853 c.c. of this product were prepared at establishments holding U. S. Veterinary Licenses, and that 4,958,-118 c.c. were destroyed because the product was either contaminated, dangerous or harmful, or did not possess the potency required.

The effectiveness of the influence of the regulatory activities of the Bureau is not to be measured by the number of cases in

which licenses have been suspended or revokekd. It is necessary to invoke these extreme measures but rarely. Improvement in conditions and in the general quality of products must be measured rather by the influence of the Bureau exerted by personal contact through its representatives and by correspondence. Through these means objectionable conditions are pointed out and in most cases are promptly remedied.

Certain results of the institution of regulatory work deserve special mention. Before regulation was exercised, the matter of the labeling of tetanus antitoxin was in a chaotic state and the purchaser had no assurance of the potency of the product. The antitoxin prepared by the various manufacturers did not have a uniform potency and the variation amounted in some instances to about two-thirds less than the strength it should have possessed. Coupled with this condition was the practice of making extravagant statements of unit strength on the labels. Furthermore, serum that was put out originally for human use and returned on account of expiration of return date, was relabeled and sold for veterinary use. At the present time tetanus antitoxin is probably the most carefully standardized product on the market.

Conditions in the production of antihog-cholera serum were as bad or worse. Instances are recalled of the sale of normal cattle serum under the name of antihog-cholera serum. There were cases where the absence of even ordinary cleanliness in connection with the preparation of the serum resulted in a highly contaminated product that caused abscess formation. A great change for the better has taken place in methods of preparing this product.

The improvement in the construction of plants, equipment, and the methods of preparing the products, as well as the quality of the products themselves, have been brought about by gradually raising the standard of requirements rather than by making precipitate changes in this respect. Many difficulties have been encountered and overcome since the law became effective; the principal one, probably, has been the securing of a large force of trained inspectors for field duty; as never before has there been so great a demand for men having the personal and scientific qualifications necessary in inspectors engaged in this work.

Still greater improvements in the general quality of products are looked for by the Department. This is desirable at all times, but in the present condition of affairs it is imperative to have on

the market only such products as are not worthless, contaminated, dangerous, or harmful. It is apparent that great good will be accomplished in the way of conserving the live stock industry of the country and combating diseases of live stock, if only pure and potent products are placed upon the market. It is essential to maintain the strictest vigilance over each step in the preparation of the various products, and it is quite clear that in this regard the manufacturer himself plays a most important part.

The inspection maintained by the Federal Government over the production of viruses, serums, toxins, and analogous products, intended for use in the treatment of domestic animals, is supervisory. It is not possible under existing law for the Government to indorse or guarantee the purity and potency of the products prepared under a United States Veterinary License.

Discussion

Dr. Reichel: This presentation, on the part of Drs. Mohler, Ward and Shore, offers overwhelming material for discussion. A good many points have been brought up that, of course, stimulate much thought. I do wish, however, to comment in one or two ways on some of the thoughts that arise.

Since 1913 the regulatory service is beginning to mean something; something to the producer, and I think more to the consumer. The aim of the regulatory service is better service, I think, on the part of the producer and on the part of the consumer. There are many things in connection with that service that are very vital. I think the admission must be made at this time that there is a good deal of misunderstanding and a cloud over many things that we are dabbling with. I doubt very much if many of us here can state clearly just what the difference is, for example, in the numerous bacterial vaccines that are recommended or are being supplied, so as to make sure. To say, for example, in the blackleg products that are coming to the front, very few, I am sure, could clearly state the difference between a natural and artificial aggressin, and anti-blackleg serum. That brings with it a very strong plea that the names of the product ought to be very clearly descriptive. I have one, as an example, the term polyvalent vaccine—the word polyvalent in itself does not mean anything, except it is supposed to cover a multitude of things. It ought to be more descriptive. On the other hand, we have such a term as *Bulgaricus bacillus*, we all know that it must be related in some manner to the term Bulgarian bacillus—that is descriptive.

Just one other thought in regard to the return date, or expiration date, which every container of a biological product must bear.

I think the statement was made by Dr. Ward that the product is expected to be efficient within that date. There is a broader interpretation, however, to be made of that term. We will take as an example, tetanus antitoxin, a 500 unit package, most manufacturers realizing that 500 units is necessary to protect a horse for a given length of time, and they will mark likewise the time in filling up the container for that product. A product that is dated, we will say, eighteen months from the time of filling, twenty to thirty per cent extra unit strength is included. The return date in that instance means a man can rest assured that he is injecting at least 500 units within that date. If the product is later and there is much deterioration, it is likely to occur to him to make allowance for slight loss in unit value. Just how fast the biological products deteriorate is, of course, unknown. There are certain reasons that are pretty well established. We do know that they deteriorate faster at the beginning than they do as they age. That has been very definitely demonstrated in tetanus antitoxin. The closest sort of cooperation is necessary on the part of producers and others in enforcing the regulatory service. The reason for this is that we need so much data on even the oldest of our biological products, tetanus antitoxin is quite definite, to give a man a definite statement as to how long the value of a 500 unit tetanus antitoxin will persist in an animal. We have, for example, a difference in the host—500 units in a human being is likely to be eliminated within two or three weeks, the reason for that being that the tetanus antitoxin prepared from a horse acts as a foreign serum in a human being; it is not the same when that same product is used on the horse, it being assimilated because in that character of serum the elimination is very slow, and while the protection in human beings is just a matter of days, it is a matter of months in the horse. The standardization of biological products ought to be the aim both on the part of the producer and those instrusted with the enforcement of the serum virus toxin act. We think sometimes we cannot do any more than has been done. I would like to think back over the work that has been done in the standardization of meningococci serum. The meningococci serum is now classified into four different groups as it affects human beings, and it has been suggested for these people to have protective tests, through the regulatory work, in the use of white mice, to establish the unit value of a given serum, a very fine accomplishment. A man need not use meningitis serum, nor must he know, before he starts, how much to expect from a given serum. The same thing is now rapidly coming to the front in pneumo-micrococci serum. The same with anti-streptococci serum can be more or less standardized in that way. As to cultural vaccine, the best that can be done at present is to insist that you receive the number of cultures per c.c., which ought to be within certain limits. I do not think that has been taken up by the regulatory service. A man may include almost anything by way of number.

DR. FRANK BREED: I think that Dr. Reichel has covered the subject pretty well; furthermore, it is a very hard subject to discuss. If you start to praise the work of the Bureau too much, they think you try to get in good with the Bureau, and if you start knocking too hard, then the Bureau has it in for us, so it puts us in an embarrassing position.

The points that Dr. Reichel brought up in regard to the standardization of serums are very good—of course, the standardizing of tetanus antitoxin has been established for some years. But take the standardization of the antistreptococcic serum and the white scours serum—to my knowledge there is no means of absolute standardization, that is, we cannot say that each cubic centimeter of the serum contains so many immune bodies, the same as you can of tetanus antitoxin, that is, that it contains so many antitoxic units.

There have been some results obtained by animal inoculation and testing against the virus, although I think the tests which are used mostly are the complement fixation or the agglutination tests which are not specific tests from the standpoint of establishing the number of immune bodies but are only relative tests. By this I mean, if you get a complete fixation in a dilution of 1 to 100 of the serum, then later on, after the horse has become thoroughly immunized you obtain a complete fixation of 1 to 1000 or 1 to 5000, that does not mean that the first serum contained 100 antibodies per volume, or in the other one, that it contains 5000 or 10000 antibodies per volume; but it means that the immune serum, which fixes the complement at 1 to 5000 or 10000 is a much more efficient serum than the one which fixes the complement at only 1 to 100.

In the preparation of the white scours serum, of course it has to be tested against a variety of organisms, because there are a great many organisms, the colon, paracolon, metacolon, enteriditis and abortion, which are used in the preparation of this serum, so it requires that this serum be tested against each variety of organism used in immunizing the horse, because immune bodies must be established for each. I do not think there is any question but that the biological products and the serums which are put on the market today are of better quality and are prepared under more sanitary conditions than they were before the Bureau took hold of this work.

Regarding the dosage of bacterial vaccines, you have just as many different numbers of organisms per dose as you have different commercial houses. There are hardly any two commercial houses that hold the same dosage on the same product which is indicated in the same conditions, and if it should be possible in any way for experimental data to be obtained through the work of the Bureau so that we could establish a certain dosage for certain bacterial vaccines, I think it would be a great help, not only to the commercial houses but also to the men who use the products in the field.

You take anti-influenza bacterin in influenza, and you will find one house that will be giving possibly 50 million, possibly 1 billion organisms per dose, and again it appears on the market from some other houses ranging from 80 to 90 billion organisms per dose. There seems to be something wrong. Some men claim good results with the small dose, some with the high dose. There must be a medium by which we ought to obtain absolutely the best results.

Regarding the regulation of the Bureau, which went into effect when I first went into the commercial line of work, in meeting men from various laboratories, I found that the commercial houses didn't know exactly how to take the proposition; some thought there was going to be a fight between the Bureau and the commercial men and others felt that the Bureau was going to assist the laboratories in preparing better products. It has been marvelous, that we found the Bureau always willing and too glad to do anything in assisting the laboratories in preparing a more reliable and a better product for the practitioner at large.

DR. T. F. KREY: I think all manufacturers agree that government supervision of biological products is a good thing. There is one important point in regard to serums that might be mentioned in this discussion, which is, that we do not always get the complete cooperation from the veterinarian that we should. I mean that some of them disregard instructions as to keeping serums properly in a cool place. In my own experience I have seen serums kept in the direct sunlight and in warm places, which are doubtless the frequent causes for poor results.

In regard to the potency test, I do not believe that serums or antitoxins can be put to too severe a test. Subjecting new veterinary biological products to experimental tests is part of my work. We send new products to a large number of veterinarians who act as experimental co-workers, to be experimentally tested under field conditions, in order to establish some definite prophylactic and therapeutic data in regard to them.

Regarding the discussion on bacterial vaccines Dr. Breed mentioned the variation in the number of organisms in the various packages put out by the different manufacturers. With our present knowledge of bacterial vaccines I believe each case we treat is an experimental case regardless of the number of bacteria in the vaccine. In my own experience in the treatment of a certain case I have obtained good results from using small doses, and in another case, presenting a similar clinical picture, I have had to use a comparatively large dose to get results, although the conditions and indications seemed to be the same.

I believe with constantly increasing knowledge these difficulties will all be worked out in time, but for the present, it seems to me, the proper way to get at it is by relating more of our personal

experience with these products. As a matter of fact, we rarely get any definite clinical data from veterinarians of cases treated.

Briefly, if we had more records of cases treated with bacterial vaccines, I think we could arrive at a complete understanding a great deal sooner, and then the strength of vaccines and the essential number of organisms would take care of themselves.

DR. C. P. FITCH: There is a point properly belonging to a discussion of this subject which is very close to my heart and really is of fundamental importance. This is the terminology used in designating the biological immunizing or therapeutic agents. In 1790 Jenner discovered the vaccine of small pox and the term "vaccine" coming from the Latin word "vacca", meaning "cow", was introduced. We did not know the vast field which was opened up by his discovery. Likewise Pasteur, in his work, followed this terminology in the treatment for rabies. It would seem that the following is a logical way of designating the ordinary biological therapeutic and prophylactic agents: (1) The term "vaccine" should be used to designate only those products which are attenuated viruses, and which, when injected, produce a mild form of disease, with a consequent active immunity. (2) The term "bacterin" should be used to designate those products which are composed of dead bacteria, held in suspension. The suspending fluid is usually a saline solution, to which a disinfectant has been added. (3) The term "antitoxin" should designate the blood serum of an animal which has been immunized to the specific toxin of the disease. (4) The term "serum" should designate the blood serum of an animal which has been immunized to the virus or cause of the disease.

DR. A. EICHHORN: I wish to say a few words on the standardization of the products prepared for the control of animal diseases. I am familiar with this work through my association with the Bureau of Animal Industry where I took an active part in the control of biological products from the time of the inception of this work; and also in my present position having charge of the commercial production of such products. I therefore feel that I can authoritatively state that a great deal has been accomplished since the law went into effect placing manufacturers of biological products under the control of the federal authorities; and producers of biological products should not hesitate to endorse the strictest kind of a control. Besides, I believe that those engaged in the preparation of biological products should assist the authorities in their endeavors. The rules and regulations governing the preparation of biological products for animal use should not differ from those which govern the preparation of human products and the standards for veterinary products should not differ from the standards for human products.

DR. BREED: I would like to ask Dr. Krey if he considers that the work of the practicing veterinarians would be a good, scientific

reliable report? Not that I am casting any reflection on the practicing veterinarians—I mean that one man using the same product may get excellent results, another man using exactly the same product, apparently in a similar case, gets very poor results. I wonder if you consider that as anything favorable on which to base a standardization of products, or should it be done in the laboratory where one man uses the same products of various strengths constantly on cases which he observes.

DR. KREY: I do not think you quite caught my point. The impression I wished to convey is this: by no means do I wish to suggest that we rely absolutely on the reports of cases treated under field conditions, because I realize that they vary considerably. I do know this, however, from experience, that the results obtained from experimental work carried on with 350 practical veterinary co-workers, in testing various products under field conditions, prove that we can more quickly reach a conclusion in regard to the value of the products. When we get clinical reports from many men, we notice that a good many of them get the same results. We can always check up the one that has gone a little astray and usually find the reason why he has gone astray. In my experience field experiments are necessary to check up laboratory results.

DR. C. E. COTTON: We have heard the side of the commercial houses. I would like to say just a few words from the standpoint of the practicing veterinarian. In the last couple of months I have been examining some candidates for the reserve army. Talking of influenza, what the indications were in the treatment of influenza I asked, along the line of biological products, what was indicated—bacterial vaccines; yes, to treat acute stages of the infection. Why? Because such and such a biological house tells us to use that. That was why. Why if these biological houses do not get good results, why do they use it? They recommend the practicing veterinarian to give the so-called bacterial vaccines to the animal. What I want to know is where the indication is for such products to be used in these acute high temperature stages. We all understand how influenza serum or antitoxins are indicated; but why shall we go and fill this animal up with a lot of killed bacteria? The animal is full of the infection; he is doing his best to fight it, and we naturally decrease the resistance by shooting these bacteria into him. Then they want to know why they do not get good reports from the work. They shoot crops of poisons promiscuously into the animal. I tell you it is a crime to advise such a thing. We understand when antitoxins are indicated. Then why should he go and shoot these ampoules of killed bacteria and decrease the resisting power of the animal, when he is doing all he can to resist it.

DR. REICHEL: The commercial house has a distinct duty. It may be summed up in a word—service. It was said here just a few minutes ago that it would be well to consider carefully field re-

ports—those who take up their duties judiciously, and consider it carefully know how to judge and weigh them. I think the reliable concern does not rest upon that information alone. The reliable concern knows that the average practitioner cannot keep up with theories and principles on which most of this work is based. In that sense I think that the producer and the consumer and the regulatory service ought to work very closely together. Field reports are of little value, as a matter of fact, to come right down to the point, and the treatment by Dr. Cotton has been good practice, to inject an animal with an animal toxin, having all symptoms of the disease, of a high temperature owing to that infection. I wish to bring up here the work of Day in California. There, for example, in dealing with typhoid fever in human beings, they make a practice of injecting rather large doses of bacilli, in other words, bacterin. The principle worked upon is something like this, that injecting the organism subcutaneously, they have a local reaction, and the reaction resulting therefrom is of value to the general infection that exists. That is the fundamental principle upon which that work is based, and that work has been more or less followed substantially not only in human practice, but upon experimental animals. It may not be a good practice in every case, but notwithstanding results can be obtained and have been obtained. I have myself seen in some of the sales stables, in horses that we were interested in and purchasing for our own work, that this treatment of the infection has been accompanied by remarkable results in obtaining or avoiding the tendency to shipping fever—no question about that.

It is a very difficult thing for all of us to keep abreast with all of these things all the time. It is practically impossible. We must have a certain amount of faith in one another. Advances that are made are startling, no getting around that. We are doing everything carefully, and go along slowly, and these acts are done, I think, for good reasons.

DR. COTTON: I do not think Dr. Reichel is making a fair comparison, he is referring to typhoid fever, which we know the cause of, he takes the organism that produced it; but I was speaking particularly of influenza. We know the cause of influenza is not a fever, or we think it is not, but we do know it is a secondary infection. I acknowledge that I have had some wonderful results, we all have, with the idea of the preventive proposition. This idea of shooting in the organism, about 20 c.c. of injection, poison, of streptococci and of coli, making a shotgun injection, and have to carry on the injection ten days, there is lots of depression. You all speak about the negative phase that we get when we are shooting into an animal for the immunizing proposition, you are decreasing that animal's resistance,, and I do not think Dr. Reichel drew a fair comparison when he referred to typhoid.

DR. ————: The proper methods of preserving biological preparations when in the hands of the practitioner, I think, is an important point that has been overlooked in this discussion. I think that accounts to a great extent for the variations you have in the conflicting reports of men in the field using these products. We find the products in a practitioner's office, probably in a bookcase, or somewhere else, in all kinds of temperatures from extreme heat to extreme cold, and I think that the manufacturers have been at fault. I think that our Bureau of Animal Industry has been at fault, to a certain extent, in not emphasizing the important point of the proper methods of preserving these intensely changeable biological products.

DR. DEVINE: I think my experience has been much in accordance with what Dr. Cotton has said, in using these bacterins. There surely is something that none of us yet know about the use of vaccines or bacterins; we who are so situated as to see their effect or lack of effect in treating large numbers of animals. By that I mean you can take perhaps fifty cases of influenza, more or less complicated, at a hospital or army camp and inject every one of them in accordance with the rules, using the dosage given by this or that biological house, and while I agree with others that I cannot see how a vaccine of this character can give immunity unless administered before exposure, nevertheless in some of these cases we get a drop in temperature in a few hours, while others which, so far as we can determine by physical examination, seem to be affected about the same, will positively show the negative phase and go bad. There are some cases that seem to be benefited even in acute cases and certainly some of them are not. I therefore feel that there is still a principle about bacterins no one yet has discovered and at present I could not conscientiously recommend influenza bacterin for treating all cases of influenza with its varied complications, neither would I positively condemn them.

DR. AMLING: At our dispensary and laboratory we closely follow and carry out the printed directions to the letter from the various houses whose products we obtain. We identify any material that is condemned by our conscientious practitioner where he has carried out the directions to the letter of the law in every respect and has performed his duty faithfully. Sometimes within a period shortly afterwards, someone comes along with a standard preparation and destroys everything that he has ever given. There should be a standardization of that material. I know that such conditions did exist and I think are probably existing in European countries. I will take, for instance, tuberculin. Along about 1891 and 1892 I went over about 3000 head, 1500 head of them I injected myself from the diagnostic point of view. The other 1500 head I reinjected upon certificates that were issued as being free and clear of disease, and I know that some of those men had per-

formed conscientious service upon the animals, from the product that they received, and nine times out of every ten those were all condemned that were passed as free from disease, by the injection of a standard product. I think it is of the utmost importance that we have a standardization of these matters. It can't do any harm, and under the control of the Bureau of Animal Industry, let us know where we stand in this matter all the time. There are a multitude of conditions in reference to temperatures, etc.; but if you have a standardization, a product that will do to stand by, and find it will not change in the heat variation. Sometimes a man is called upon to drive out probably fifteen or twenty miles from home, making two or three calls before he has an opportunity to use that product. There may be varying atmospheric conditions, temperature changes—and so if the product is proper as it ought to be, I do not see why the results could not always be obtained.

DR. L. R. HIMMELBERGER: I would like to ask Dr. Ward if the Bureau has promulgated regulations relative to standardization of biological products. I have seen in the possession of various practitioners the products of different houses, bearing labels claiming the contents of the vial to contain one hundred billion organisms per c.c. I do not believe you could get that many organisms per c.c. without giving the product a creamy consistency. While I am not in the biological business, I find that practitioners always desire to know the number of bacteria per c.c. It seems to me that a house that does business on a strictly legitimate and honorable basis is placed at a disadvantage by houses that, you might say, "pad" the bacterial content of the product offered for sale. It appears to me as if the Bureau is responsible in not checking up the actual number of bacteria contained per c.c. in the products offered for sale, if that be possible.

DR. CONNAWAY: I think that the objectionable practices in regard to the exploitation of biological products, which are complained of by Dr. Cotton, could be obviated by placing the manufacture as well as the inspection of some of these products wholly in the hands of the Government. Dr. Ward in his paper said the Bureau does not undertake to guarantee the potency of the biological products whose processes of manufacture are supervised by the Bureau's agents. I think the practitioners of the country would be glad to see a larger responsibility placed upon the Bureau in regard to these matters. This may be regarded by some as "paternalism", but I for one am not afraid of this kind of paternalism. The Bureau at the present time is making blackleg vaccine, and distributing it free to all parts of the country wherever needed. And I wish it were possible for the Bureau to make all these products which are necessary for the control of infectious diseases, and to furnish them free, or at cost of production; and especially those that pertain to eradicable diseases. This, of course, would be a big task. But I

am inclined to think that if the large inspection force, which is now employed on certain phases of this work, were turned to the actual manufacture of some of these products, we would have better results than through the inspection of commercial plants. Under present conditions the Bureau cannot guarantee the potency of the products—that is to say, *guarantee* good results in the field application of such products. And that would be impossible even if they had full charge of the production and distribution; because of the varying conditions that arise in the field use of such products; conditions which cannot always be foreseen and controlled. But if these products, which are subject to deterioration, if not properly cared for, were manufactured and distributed by official agencies, the responsibility would be more definitely fixed, and the cause of unsatisfactory results could be more easily traced and overcome. As the matter now stands, a product which may be potent at time of official inspection may, by no means, be potent when used in the field. Yet producers and distributing agencies, through their literature and labels have used the official prestige of the Bureau to exploit and guarantee the good quality of their products; and the users of such products are sometimes deceived. If such objectionable commercial practices continue, popular demand may force the Federal and State authorities to take over the manufacture and distribution of all biologic products, or at least those concerned with the control and eradication of infectious diseases. And this, I believe, will not be detrimental to the best interests of the veterinary profession.

DR. COTTON: I wish to put myself right. I do not wish to condemn the biological or the commercial houses. I think they are doing a grand work with their products, but the idea of advising the general practitioner in the field to shoot these so-called bacterial vaccines into animals with acute high temperature is the part I was talking about, but I do not wish to see this thing break out into an argument. I do not believe it is the function of the manufacturer to say use this, that or the other product. I think there is a necessity for biological and commercial houses. They are doing a grand work. But the practitioner is being led by them and I do not want them to be led to use things which are not explained, and if they would be a little more careful with their literature, they would get better results, they would be on a safer foundation before the practitioner, and it would be to their commercial interest to be a little more careful in telling the practitioner where to use these products.

DR. WARD: It is a pretty large order to sum up adequately the various references that have been made. It is a large subject. Dr. Himmelberger, I think, is the one who asked a specific question of me. In my travels back and forth I have had various manufacturers say to me that "Our competitors are labeling the dosage

of bacteria high. What will the Bureau do about it?'' I said to practically each one of them, ''If you will point out how the Bureau can check the accuracy of the dosage, we will do it.'' That is to say, we cannot go on the open market, buy a sample of bacterial vaccine, said to contain ten billion to the cubic centimeter, take it back to our laboratory, count it and say that the label is not correct, there are not ten billion organisms present. We have not the technical method to do it; it is an embarrassing situation, but that is the fact.

There has been something said about practitioners' results and their value. Practitioners are the men who make the market for these products, but the conditions under which they are working make it somewhat difficult to control tests of products in the sense that scientific experiments are controlled. The conditions under which practitioners are working are particularly difficult, it seems to me, for getting accurate data, because of the very practical difficulty of leaving untreated animals as controls.

HOW TO OBTAIN OUTSIDE COOPERATION IN ADVANCING TICK ERADICATION*

J. B. REIDY, Houston, Texas

The method of obtaining outside cooperation in advancing tick eradication propaganda consists in convincing the individual or commercial body that the ''Eradication of the Cattle Tick'' affects them directly and that it is a work that depends on their cooperation in a measure, and they should take their due responsibility.

You must have a convincing argument to secure this aid. To illustrate: there are around Houston, Texas, thousands of acres of idle lands—good soil, good climate, and good markets in that locality, but the lands remain unsettled. The commercial organizations of Houston are anxious to get these vacant lands settled. Knowing how the fever tick has killed the northern man's fine cattle, that he brought into the tick infested territory, and discouraged him in the attempt to make a living in south Texas, I put this up to the commercial bodies: ''Get rid of the ticks in the community and your lands will settle up with good farmers in short time, but as long as your climate, grasses, and soil are condemned for the damage done by the cattle tick your county will have a black eye.''

I went out into the country with members of the Young Men's

*Conference on Tick Eradication, New Orleans, La., January 15-18, 1918.

Business League of Houston, and explained to the farmers at school house meetings what damage the tick was doing, and how to get rid of the pest. The farmers paid close attention, and always some one in the audience would testify to having lost his best cow with bloody murrain, caused by the ticks, or some similar experience. By these means I soon convinced the Young Men's Business League of Houston that it was their work, as well as the United States Government's, to get rid of fever ticks—if they wished to see their farmers prosper.

Railroads will cooperate when their attention is called to the great losses in transportation of thin, emaciated cattle, due to cattle ticks, and the possible development of some live stock farming along their lines after the ticks are eradicated. The railroads in my district have distributed to station agents along their lines "Dip That Tick" posters, with instructions that the station agent post in a conspicuous place.

Banks and bankers cooperate when they understand the economic importance of tick eradication. The points of interest to the banker are better and safer security on live stock loans, more prosperity for the live stock farmers, and better markets when ticks are eliminated. The bankers readily agree to post a "Dip That Tick" poster in a conspicuous place in the bank, and each poster thus placed before the public is so much gained for tick eradication.

School teachers, especially in the rural districts, cooperate once they understand the damage the tick does and methods of eradication. Tick bulletins are furnished these teachers, so they may teach their pupils how necessary it is to "dip the tick". School children are often the means of teaching their parents on such subjects.

Bodies of consumers, such as labor organizations, housewives' leagues, traveling men's associations, etc., cooperate when the tick expert convinces them that ticks on cattle cause disease and also a reduction in milk yields and beef production, and that it is practical and easy to get rid of the pest. It has been stated by some opponents of tick eradication that the consumer was not interested in this work, but I see no reason why the man who eats the meat and drinks the milk from tick infested cattle should not have a voice in the eradication of the tick. I know from experience that, as a rule, the consuming public are in favor of better, cleaner and

more sanitary food of all kinds, and tick eradication is essentially a sanitary measure. The consumer also is generally in favor of any measure that reduces the cost of production of an article, and "getting rid of ticks" is such a measure, because experiments prove ticks take 18% to 42% of the dairy animals' milk—without the ticks such animals would give that much more milk without increasing the food, and thus cause a decrease in the cost of production, so the selling price could be correspondingly reduced.

Newspaper cooperation is secured by placing the subject before the editor in a clear, intelligent, and practical manner, always bringing out how tick eradication applies to that particular locality. To illustrate: "The section where the paper has its circulation may have many natural advantages for dairying, but the industry has not been developed, due to the presence of cattle ticks." So the editor readily agrees to give space in his paper to tick eradication articles as a patriotic and public service. He sees that getting rid of the tick is going to benefit him, because the community will be benefited, which indirectly helps him. We all know that the newspaper is the most important single factor in educating the public on any subject, and great credit is due for the part the papers have taken in the great constructive work of tick eradication.

The cooperation of county boards of commissioners is of the utmost importance, because it is such bodies that furnish most of the money to carry on the work—either preliminary or active. On arriving in a new county it is wise to visit the local postmaster, who will advise you on such points as: the leading live stock men in the county, the most progressive members of the county commissioners' court, etc. Our next move is to visit the leading live stock men of the district, explain tick eradication to them, its value, and method and manner of eradication, and then ask them, if they are favorable, to be at the next meeting of the commissioners' court, to ask for assistance in tick eradication work in the county. Next visit personally each county commissioner, explain the importance of the work to him, and convince him that it is a good thing for the public welfare and necessary for the development of the live stock industry to get rid of ticks. Also visit the county judge. Go over the subject carefully with him and make an appointment to appear before the board at their next meeting. If a local commercial organization is in the place, visit it and secure a committee to go with you before the commissioners at the coming meeting. The news-

paper man has already been visited, and has printed in the press the value of dipping vats and importance of tick eradication, so on your appearance before the county board, supported by the leading live stock men of the county, the local commercial organizations, the local newspapers, and presenting the subject of getting rid of ticks in a clear and intelligent manner, the county court as a rule allows whatever is asked—such as two demonstration public dipping vats in each commissioners' precinct, so that people who wish to dip their cattle may do so. Whenever we obtain one dipping vat in a district we have convincing proof of tick eradication, then each man who dips his cattle gets lice and ticks off them and his cattle get fat quicker on the same grass than his neighbor's cattle, because he is feeding cattle only, while his neighbor is feeding both cattle and ticks.

As a grand summary I would say: first, know your subject from all angles thoroughly, treat every one with courtesy, be earnest, and have your work at heart above all other considerations, be tolerant of ignorance, and also be progressive—go ahead. If you don't succeed at first, try, try again. Patience is essential.

CLINICAL AND CASE REPORTS

A FURTHER STUDY OF THE ETIOLOGY OF ROUP IN FOWLS*

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In a bulletin entitled "A Study of the Etiology of Roup in Birds", Technical Bulletin No. 4, Kansas Agricultural Experiment Station, the following summary of experimental data appears:

> 1. A bacterium, designated culture "33A", having all of the morphological, cultural and biochemic characters of the pasteurella group, apparently deserves recognition as the etiological factor in roup.

*The term "roup" as used in this work has to do with that condition in fowls technically known as avian diphtheria, and which is characterized by the formation of grayish white diphtheritic patches upon the mucous membranes of the mouth, nose and eye. Various common or synonymous terms are frequently used such as: contagious catarrh, canker, swell head and ocular roup.

2. The organism has been recognized by smears in all cases of roup examined.

3. It has been isolated and grown upon artificial culture media and the characteristic local lesions of the disease again reproduced.

4. Finally, an absolute protection has been shown against the natural disease after immunization with a pure culture bacterin of this organism.

The purpose of this paper is to present some additional evidence that has accumulated since the bulletin referred to went to press.

To make clearer the following experiments it will be desirable to discuss briefly some parts of the previous work.

1. Introduction. The presence of bipolar staining organisms in the lesions of roup have been reported by many investigators in the past. By some (1), (4), (5) these organisms were believed to be the specific cause; by others (2), (6), (7) they were assigned no significance being considered merely as saprophytic invaders. More recently (8), (9) they have been ascribed a secondary rôle, the primary (9) being played by an ultra-visible virus.

2. Isolation of Organism. The blood stream and viscera of a dead roupy bird are in most cases bacteria-free, but the local lesions are packed with a miscellaneous flora of microorganisms. Cocci, rods and spirilla are represented in greater or less numbers. Direct isolation by plating yields unsatisfactory and confusing results, the numerous saprophytic organisms usually rapidly overgrow the real pathogens. The use of rabbits for the purpose of isolation solved the problem. A suspension of the mixed organisms when injected into the axillary space of a rabbit causes death in 24 to 48 hours. A loop full of the heart blood of the dead rabbit when transferred to a meat infusion agar slant always gives a pure culture of organism "33A".

3. Reproduction of the Typical Lesions of the Disease. A few years ago M. Bordet, the eminent French bacteriologist, in a study of this disease, said, "Many organisms have been described as causing the diphtheria of fowls and pigeons. But it is remarkable that with none of these organisms have the exact lesions of the natural disease been produced". It is a well known fact, to those familiar with the disease, that the natural and spontaneous transmission of the disease from bird to bird in a flock is most irregular and uncertain. Seldom will more than 5% of a flock be-

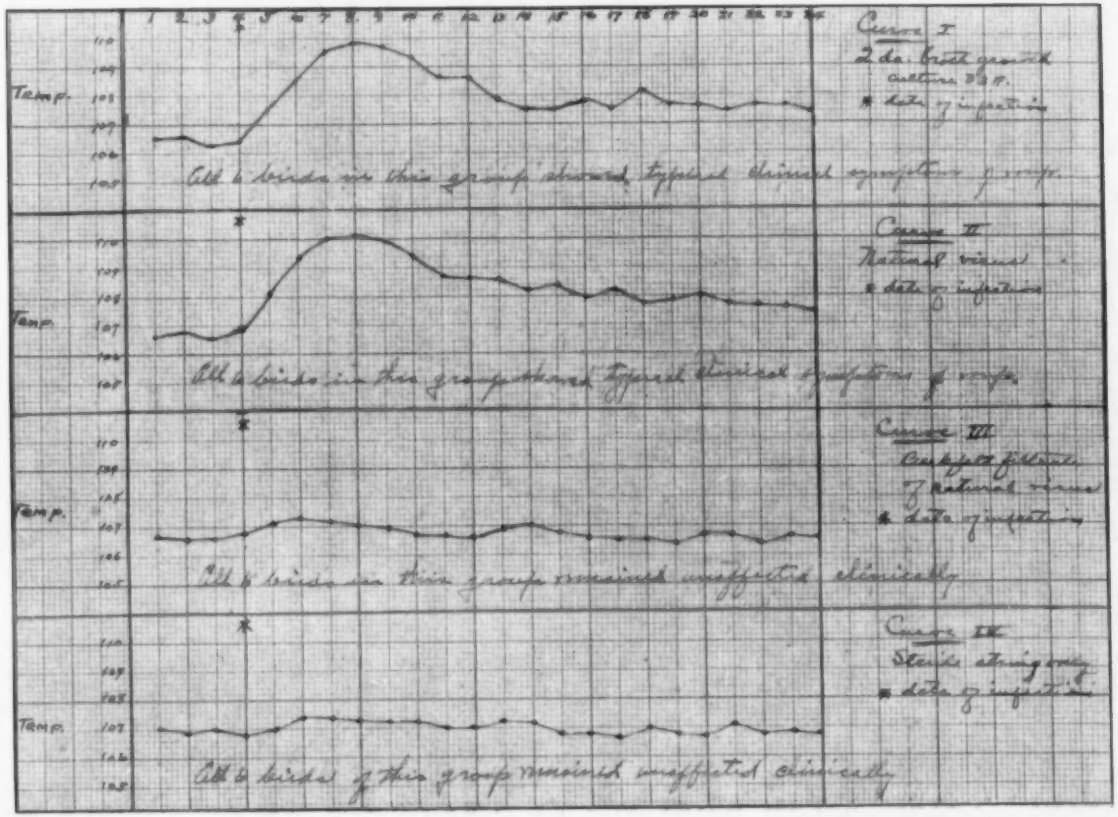
come affected. Nor is any method which depends upon a cutaneous or subcutaneous injection of pathological tissue suspensions more sure of producing the characteristic lesions. Death may result when a salt solution suspension of diphtheritic membrane is injected into the body of a bird; but none of the local eye or mouth lesions develop. The following method, however, proved to be certain and dependable for reproducing the characteristic local changes: The diphtheritic membrane from a dead roupy bird is ground to a thin paste in a sterile mortar, using a few c.c. of salt solution if necessary. (This suspension of ground tissue and organisms is referred to in this work as "natural virus".) A piece of common wrapping twine, previously threaded to a large curved suturing needle and sterilized in the autoclave, is saturated with the natural virus and passed through the eyelid of a healthy hen. The free ends of the string are so tied that a small loop is formed, thereby permitting tissue expansion. In 24 to 48 hours a profuse watery discharge develops from the infected eye, which is followed rapidly by a series of changes that will ultimately end in the typical swollen eye and face as seen in the natural disease.

4. Protective Inoculations. Six hens were injected at weekly intervals with increasing amounts of a bacterin. This was made by carbolizing a four-day growth, in broth, of culture "33A". One week after the 4th injection these six immunized birds were each infected by the eye string method with fresh natural virus. In 10 days all of the non-immunized hens showed characteristic roup, the six immunized hens, on the other hand, all remained unaffected.

In the following temperature charts an attempt is made to demonstrate, if possible, constitutional disturbances as shown by a temperature curve that might lead to the support of (1) the presence of a filterable virus or (2) the specificity of culture "33A".

Groups of six hens were infected by the eye-string-technique with (1) 48-hour-old broth growth of culture "33A", (2) natural virus, (3) Berkefeld filtrate (filter N) of natural virus, (4) sterile string only.

Temperatures of each hen were taken daily and plotted separately. But only the average temperature was computed for each group of hens receiving the same inoculum. Therefore each curve shown in the accompanying charts indicates only the mean temperature curve for the six hens of that group.


Temp.
Curve I
2 da. brut grouse
* date of inoculation
All 6 birds in this group showed typical clinical symptoms of grouse.
Temp.
Curve II
Natural virus
* date of inoculation
All 6 birds in this group showed typical clinical symptoms of grouse
Temp.
Curve III
Subject to filtrate
of Natural virus
* date of inoculation
All 6 birds in this group remained unaffected clinically
Temp.
Curve IV
Sterile strong emulsion
* date of inoculation
All 6 birds of this group remained unaffected clinically

CONCLUSIONS. 1. The great similarity of the gross lesions and the temperature charts of groups I and II (curves I and II) would appear to further support the claim that culture "33A" is the etiological factor in roup.

2. The absence of any gross lesions or thermal reactions in the groups represented by curves III and IV would seem to throw doubt on the presence of a filterable virus.

FIELD WORK—K. S. A. C. POULTRY FARM

During May and June, 1917, a number of chickens were injected subcutaneously with a bacterin of culture "33A". Some birds received 1 c.c., others received 5 c.c. amounts. Ten days later a chronic case of roup which had developed on the farm, in another pen, was destroyed. The infected membranes from the eye were removed and emulsified. Sterile cotton strings were saturated with the emulsion and sewed into the upper eyelid of each of six hens that had received the 1 c.c. amounts of culture "33A" bacterin, and six of the hens that had received 5 c.c. of the bacterin.

Within 24 hours all exhibited swollen and inflamed eyelids. By 72 hours all were dead. Two of those that had lived the longest showed moderate roupy symptoms and lesions. Autopsies on the dead birds revealed the presence of large numbers of bipolar organisms in the body fluids.

For various reasons the experiment was not carried further. One of two possibilities might account for the negative results.

1. One small dose of bacterin "33A" apparently produced a hypersensitiveness toward the virus rather than an immunity; or

2. That an unusually virulent strain of virus was present in this case.

However, in looking at the negative results from a different angle one might logically believe that in any field work no natural infection probably ever occurs that is comparable in severity to that caused by the eye-string-virus-method. Hence while one dose of the bacterin conferred no appreciable protection against the eye-string-virus it might yet serve to tide the bird through a natural exposure. Statistics show that in most outbreaks of roup the majority of birds will pass safely through unaffected. Presumably the balance between the vitality of the individual bird and the devitalizing effect of the virus must be generally strongly in favor of the former and any slight additional protection might still be suf-

ficient to aid a goodly number of the susceptible birds, those of slightly lowered vitality, to throw off the infection.

The writer believes that a common cold, an infectious coryza, may often pave the way for roup. Just as in the human subject a common cold may precede tuberculosis. Yet no one would say that tuberculosis was caused by the now highly probable, filterable virus of coryza (10).

FINAL CONCLUSION. 1. Roup is a specific disease of fowls caused by a specific bacterium.

2. Roup should not be confounded with the various other secondary maladies which may or may not associate themselves with roup.

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A FEW CASES MET IN GENERAL PRACTICE*

F. U. FERNSLER, Lebanon, Pa.

1. In answer to a dystocia call I found a small grade Holstein heifer in labor twenty-four hours. On examination I discovered a breech presentation, nothing within easy reach excepting the tail, the calf being dead. The heifer was on her feet but as soon as an attempt was made to push back the calf to facilitate the raising of a foot over the edge of the pelvis, she made violent expulsive efforts and dropped down. On the floor the chances to repel were still smaller so I proceeded to raise the hind quarters. A heavy cow chain was fastened around a beam overhead and a block and fall attached to this, one hook being inserted in a ring strapped to the hind cannons of the heifer. The hind end was then

*Presented at the meeting of the Pennsylvania State Veterinary Medical Association, Harrisburg, Pa., January 23, 1918.

raised about two feet. In this position the expulsive efforts of the heifer were reduced to a minimum. The repeller was applied to the ischial region and the calf pushed back as far as possible but this did not furnish sufficient leeway to turn the foot back into the pelvis. By slipping the repeller down the posterior surface of the thigh to the flexure of the stifle and raising as well as repelling at the same time, I was able to bring the foot into the pelvis. The second foot was obtained in the same manner. Both legs were then corded. The heifer was lowered and delivery attempted by traction on the cords. We dragged the heifer instead of making any progress so I had to resort to other means to keep the heifer in a fixed position and deliver the calf with the block and fall. The only "man power" available was that contributed by the owner and myself.

A heavy thirty-foot rope was secured. On the one end a fixed loop was tied. This loop was made just large enough to fit over the pelvis. The loose end was carried forward between the upper hind leg and the udder, the cow of course lying on her side, then between the fore legs to a post and back along the withers and loins and tied to the loop at the sacrum. One end of the block and fall was fastened to a post behind the cow and the other end to the cords on the calf's legs. Then by careful traction we effected delivery.

If the rating of the blocks is correct we exerted approximately 1000 lbs. pressure on the maternal pelvis.

In a few hours the cow regained her feet and made an uneventful recovery.

In this case I have tried to illustrate the value of simple mechanical means in saving the time and strength of the operator and affording prompt relief to the patient.

2. On a Sunday afternoon in September I was called to attend a case of colic in a small two-year-old filly. The symptoms were about as follows: conjunctiva slightly injected, pulse rapid and firm, respirations slightly accelerated and the temperature 101.5°F. The pains were fairly constant but not very acute. In fact the general conduct of the case suggested a diagnosis of subacute obstruction of the colon. I administered two drams of nux vomica with an ounce of ammonium carbonate in capsules and followed with a half grain of eserine hypodermically. A few doses of lobelia were left to be given subsequently if the pains were severe. On the following morning the case presented a much graver as-

pect. The respirations were short and rapid, pulse wiry and fast, running 80 to 90 per minute and the temperature 103°F.

The conjunctivae were highly injected and the pains constant. A rectal examination was made and to my great surprise I was able to feel, through the rectum, a thin sharp object, resembling a nail, penetrating through the wall of the single colon. My mind was immediately made up as to the prognosis so destruction was advised. This the owner would not allow so anodynes were administered until the filly died two days later. The chance of relief by surgical interference was also offered the owner, but this, too, was spurned. Personally, I feel sure that the ultimate outcome would have been a fatality just the same.

On post mortem we found a five-inch chestnut splinter transfixed in the single colon. The splinter was half an inch thick and pointed at both ends. Both ends punctured the bowel and a third hole was found in an adjacent fold of the bowel. A large mass of feces was packed against the splinter, forming a complete obstruction. The liquid contents of the bowel, together with some small particles, escaped into the abdominal cavity and set up a diffuse peritonitis.

When the splinter was shown to the owner he recalled that the colts, while at large in the orchard, were on several occasions seen gnawing at some chestnut rails.

What seems to be most remarkable is that the splinter should pass through yards and yards of the small intestines with impunity only to do damage within a few feet of the anus where we might expect the larger fecal masses to form an efficient cloak for a sharp foreign body.

This case shows the value of a rectal examination which really should be a routine procedure in examining all colic cases and the satisfaction a post mortem may afford in clearing up the mysterious.

3. Recently I attended a horse that was apparently suffering from a complicated case of pneumonia. Some indefinite signs of trouble were noted three or four days before but the horse did not present any serious symptoms until the day I was called.

As I recall the case the temperature was slightly above normal, the pulse very weak and irregular and the respirations painful and jerky but not rapid. Harsh, squeaky sounds were noted on auscultation. In general, the horse presented a clear picture of rapid decline, so an extremely unfavorable prognosis was given. The patient died about eight hours later.

On a subsequent visit to the same farm on account of another case, I was informed that a post mortem examination had been made by the owner and a neighbor with the following findings: a king-bolt, twelve inches long and three-fourths of an inch in diameter with a head of proportionate size, was found in contact with the left lung and pericardium. The extent of the pathological changes was not noted. The bolt apparently gained entrance to the body through the left flank as there was a thickening on the inside, evidence of the healing of an old wound.

The horse had a habit of rolling when let out to water, so we presume the bolt, possibly lying on the ground, was forced through the abdominal wall while the horse was rolling.

The owner remembers that this particular bolt was missing fully a year so the horse no doubt carried it a great part of that time.

AN OPERATION TO STOP THE NOISE MADE BY THE PENIS IN THE SHEATH WHEN THE HORSE IS GOING AT A TROT OR GALLOP*

W. M. Bell, M.D., D.V.S., Nashville, Tenn.

While in Sherman, Texas, twenty years ago this summer, I had a patron, a very sensitive young man, who had a nice driving horse. When this horse would trot his penis would make a noise, which annoyed the owner very much. He came to me to see if I could remedy the trouble, thinking it was in the bowels. When I told him where the noise came from it became unbearable, so I would pack the sheath with a piece of cotton cloth every time he went out to drive.

I then made a study of how the noise occurred. The prepuce in these cases closes well over the end of the penis but not close enough to exclude the air. The penis working backward and forward presses on the imprisoned air and produces this noise. When I had found the cause the remedy was easy—a split in the prepuce on the lower side, allowing the air to escape without sound, being all that is necessary. The restraint I use is twitch and shackles on hind feet.

*Presented at the 54th annual meeting of the American Veterinary Medical Association, Kansas City, Mo., August 1917.

Wash the sheath and clean as for other surgical operations, stand on the left side and pass the left hand into the sheath—pass the first two fingers through the opening in the prepuce, engaging the prepuce with two fingers inside and the thumb on the outside, then with a strong pair of blunt end scissors, cut the prepuce on the lower side from before, backward, about two inches—give an immunizing dose of tetanus antitoxin and after treatment is unnecessary.

I have performed this little operation many times in the past twenty years but not many in the last five. The results have in every case been entirely satisfactory, no complications have ever followed. It has been a satisfaction and a money maker for me and I hope it will be for many others.

RETENTION OF MECONIUM—UNBALLING THE COLT*

W. M. Bell, M.D., D.V.S., Nashville, Tenn.

Those who practice in a breeding district are aware that they have calls to foals one day old that are suffering from constipation that enemas alone will not relieve. An enema, when used with glycerine, will relieve this condition as a rule, but occasionally we meet with one, while the feces may be washed out of the rectum, there will be a bunch of balls just beyond the rectum, over the pubis, that will not come up into the rectum by the assistance of enemas. The foal continues to strain, refuses to suck and dies when enemas and cathartics are used alone.

These cases may be relieved with the handle of a pair of scissors or dressing forcep, but they are awkward to handle and there is danger of lacerating the parts to an undue extent, so my brother, Doctor John Bell, has made an instrument which is safe, easily made and works admirably.

After using the enema the instrument is passed into the rectum until the hard balls of fecal matter are felt. By pressing gently against the fecal matter the ball will become engaged in the ring and is easily withdrawn. By this process it only takes a few minutes to entirely relieve the trouble.

*Presented at the 54th annual meeting of the American Veterinary Medical Association, Kansas City, Mo., August 1917.

CARRYING THE HORSE'S AGE INTO COURT*

W. M. Bell, M.D., D.V.S., Nashville, Tenn.

At this time of automobiling, and accidents resulting therefrom, we have a great increase in our court cases, and sometimes the evidence given as to the condition and age of the injured animal varies to such an extent, and witnesses are so contradictory and at times there are several as against one, making it necessary to have some way of fixing these points beyond dispute. It was from this necessity that I found a way to carry the horse's age into court.

I carry with me, as a part of my regular paraphernalia, a piece of modeling composition. I call for a bucket of hot water and drop the modeling composition into it—in four or five minutes I take it out and press it over the lower incisors. After about ten seconds it is removed and in one or two minutes more it is hard enough to place in my grip. On reaching my office this impression is filled with dental plaster. When it has set, it is placed in hot water for a short time and the composition removed. This gives an exact reproduction of the horse's lower incisors which is marked, dated and laid away for future use. If the case goes into court, I take this reproduction with a copy of *Huidekoper's Age of Domestic Animals*, which is sworn in as authority and the reproduction is compared with the cuts in the book. In this way I have been enabled to win out with five or six experts on the other side.

*Presented at the 54th annual meeting of the American Veterinary Medical Association, Kansas City, Mo., August, 1917.

—Dr. A. J. Abbott of Marshfield, Wis., was elected president of the newly organized Central Wisconsin Association of Graduate Veterinarians. Dr. S. E. Cottrell was elected vice president, and Dr. W. R. Swann, secretary-treasurer. The territory embraced by the organization embraces eight counties. Twelve charter members were present at the opening meeting.

—Dr. A. S. Almeida has removed from Los Banos to Dixon, Calif.

—Dr. C. D. Turney has removed from Germantown, Ohio, to Eaton, Ohio.

ABSTRACTS FROM RECENT LITERATURE

AN INTERESTING PIG CASE. J. E. Cartwright. *Veterinary Record.*—A pedigreed sow having farrowed was found the next day paralyzed. From the loins back she was affected and the hind legs were flaccid and insensible to pricks from a pin. Spinal injury was diagnosed, and to save the little ones, if possible, instead of slaughtering the sow she was made and kept as comfortable as possible until the young pigs could feed and provide for themselves. When afterwards the sow was killed the post mortem revealed a fracture of the posterior dorsal vertebrae. It seemed that previous to her having her litter she had sustained a fall backwards when trying to get out of the sty. A. L.

COMPLETE SEVERANCE OF CAROTID ARTERY WITH SPONTANEOUS ARREST OF HEMORRHAGE. Lieut. L. C. Maguire, A.V.C. *Veterinary Record.*—A horse attempting to jump a six-foot high iron gate, with sharp spikes on the top, got one of them entering the near side of the neck, about the upper part of the lower third. The spike missed the trachea, esophagus and jugular veins, but tore the mastoido-humeralis and sterno-maxillaris muscles with the nerve and left carotid artery. Then it came in contact with the cervical vertebrae and passed outside near the chest.

The author saw the horse one and one-half hours after the accident. He found him in a loose box, with four inches of the carotid protruding from the wound. The bleeding had completely ceased without any manual interference whatever. The severed distal end had retracted and after being brought out was found with a well formed clot. Such existed also in the other portion of the artery. Ligation of both ends with catgut and suturing of the other parts were followed by complete recovery. A. L.

THE FUTURE UTILITY OF THE PESSINA METHOD FOR DETERMINING THE AGE OF HORSES. Rudolf Disselhorst. *Kohn-Archiv.,* Vol. 6, Second Half Vol., pp. 207-325. Halle A. S., 1916. Abst. from *Internat. Review of the Science and Practice of Agriculture,* Year VIII, No. 2, Feb., 1917.—The Pessina method for determining the age of horses by their teeth is about a hundred years old. The method has often been severely criticised but without effect. Of late, age determinations of horses whose age was known, have shown that the Pessina method is only trustworthy within wide limits.

The researches of Heinze, Ackerknecht, and Müller and Schwerdt may be mentioned in this connection.

The writer had made a thorough examination of the incisors derived from the skeletons of 42 horses and mules, the ages of which were exactly known. He has also examined 12 entire skulls of solipeds bred at the Zootechnical Institute of Halle University and of which consequently the ages were also known. Finally, records were taken of the dental measurements of a large number of horses, asses and mules, still living and of known ages. The measurements were taken by means of a specially constructed rule.

The results obtained are compared with those of Pessina. The conclusions may be summarized as follows:

(1) In many cases, the observations on the cups (infundibula) in the crowns of the teeth are not in agreement with Pessina's data. The majority of times, the age determined in this manner is in excess of the reality. The depth of the cup, particularly, is quite irregular.

(2) The cups do not always disappear from the incisor of the upper jaw, in spite of these being the longest teeth. It was by no means rare to find more or less distinct traces among these teeth, whereas the infundibulum had practically disappeared from the corner tooth, which is shorter. Traces of cups were found in the middle and corner teeth of one side of a thoroughly old horse (32).

(3) Both in transversal and longitudinal section the grinding surfaces of the teeth in cart horses are always 1 or 2 mm. larger, but in this respect there is a good deal of variation, both between the teeth of the same jaw and between those of upper and lower jaws. The triangular form has been found to occur in a horse as young as 6 years old, and conversely, the oval form has been found in the upper jaw of a horse 18 years old.

(4) In nearly all mouths, even in those of very young colts, the lower jaw is longer than the upper. It is very rare to find a pure type of bow-shaped jaw (1). Such jaws are seen, however (asses, mules), up to an advanced age, whereas the semi bow-shaped jaw predominates among horses of any given age and may be seen to a certain extent even at the most advanced age (32 years). On skeletons at any rate this feature is incapable of serving even as an approximate indication of age. It is impossible to say of what age an angular jaw is indicative. In living subjects the gums give a

somewhat different conformation to the jaws, and bow-shaped jaws are no longer seen. Here again the writer has noted from the few jaws examined that the same form occurs in animals of fairly widely differing ages.

(5) The labial walls of the alveolar processes in 3-year-old colts are already shorter than the lingual walls; as the teeth increase in length, that is to say, as the animal grows older, they recede still further. The lateral walls remain for the greater part of the time at the same level.

(6) As regards the "tushes" their appearance, change of shape and wear, they exhibit such variations as to lose all importance in the determination of age. By no means rarely they are completely lacking in the mare; on the other hand they are often present in both jaws.

(7) The time of appearance of the V-shaped groove is quite irregular, it is often observed in animals as young as 7 years. Consequently it is of no value for age determination.

M. J. HARKINS.

A DISEASE IN CATTLE IN THE PHILIPPINE ISLANDS SIMILAR TO THAT CAUSED BY ANAPLASMA MARGINALE THEILER. William Hutchins Boynton. *The Philippine Journal of Science*, Vol. XII, November, 1917.—A cow showed a very depressed appearance. Pulse was high. It was indifferent to irritation. Surra was not found and the clinical picture of rinderpest was absent. An examination of the blood showed about 30% of the red corpuscles to be infected with the bodies known as *Anaplasma marginale*. There was pronounced edema under the jaw. Temperature, which had been high, became subnormal.

Autopsy showed the blood to be very anemic. Mucous membranes, flesh and lung tissues were very pale. Lymphatics were swollen and edematous. Spleen was enlarged, with softened pulp. Kidneys were congested and blotchy. Intestines were bile streaked and were slate-colored. The general appearance was that of marked anemia. The bodies found in the red corpuscles were one to five in number. They were not always equal in division. They were located at times one at the periphery, one at the center. This was not regular. They showed a tendency to the spherical. The bodies have been produced artificially. The bodies found might be due to the infectious disease caused by anaplasma or due to various

other conditions. The two types cannot be differentiated at present. The blood of three cows showed the bodies. HAYDEN.

SURGICAL TREATMENT OF COMPOUND FRACTURES OF THE RIBS. Capt. A. R. Routledge, A.V.C. *Veterinary Journal.* Make an incision, varying in length according to the fracture, about the middle line of the bone and down to it. Dissect the periosteum and expose the bone all around. Avoid puncturing the thorax. Cut the ribs transversely above and below the fractured areas and excise the piece. Transverse fractures are the easiest to deal with. Be careful of broken, long, sharp fragments which are apt to penetrate the pleural cavity. The after treatment is that of a granulating wound. A second operation is seldom required. A. L.

FOREIGN BODY IN THE PHARYNX OF A HORSE. Capt. C. E. W. Bryan, A. V. C. *Veterinary Journal.* Record of a case where the foreign body was a large, sharp, thorny twig which had become embedded in the mucous membrane and muscles of the back of the pharynx and required considerable ingenuity to remove without damage to the tissues. The animal had to be cast for the removal.

A. L.

FORAMEN OF BOTAL. Drs. Menestrier and Wolff. *Presse Medicale.*—This is the peculiar observation of a patient, 50 years old, who was brought to a hospital cyanosed, unable to speak and suffering with severe dyspnea. Submitted to treatment of cardiac affections, he died and the post mortem revealed a severe cardiac malformation, viz., the persistence of the foramen of Botal, allowing an easy communication of the circulation between both sides of the heart. Besides his age, it is surprising to know that during his whole life this man had always performed heavy labor.

A. L.

THE VITALITY OF THE RINDERPEST VIRUS OUTSIDE THE ANIMAL BODY UNDER NATURAL CONDITIONS. A. W. Shilston. *Memoirs of the Department of Agriculture in India.* October, 1917.—At the laboratory infection persisted in buildings up to 48 hours. Ground, shaded by trees, was infective to healthy cattle up to 18 hours. Directly exposed to sunlight infection was not possible after 8 hours. Buildings in the plains were infective for 20 hours, shaded

areas 24 hours, and in direct sunlight 6 hours was the maximum period.

In mixed feces and urine the virus survived for 8 hours in sunlight, but when protected survived up to 54 hours. The maximum period for saliva and nasal discharge was 44 hours. The virus can survive for 51 days in the blood from a sick animal even though the blood has become putrid. Carcasses thus may be the source of the disease for many days. HAYDEN.

A CASE OF ROPY MILK DUE TO BACTERIUM AEROGENES. G. Dalla Torre. *Annuario della R. Stazione Sperimentale di Caseificio di Lodi.* Year 1915, pp. 23-30. Lodi, 1916. Abst. from *Internat. Rev. of the Science and Practice of Agric.* Year VIII, No. 5, May, 1917, p. 793.—A serious case of infection due to *Bacterium aerogenes* was observed, in 1915, in the neighborhood of Piacenza, Italy, on a farm where the milk of the whole herd was perfectly normal after milking, but which, after 10 or 12 hours, became ropy, finally becoming a mucilaginous mass.

The cows were all examined by a veterinary surgeon and were found to be healthy. After the close examination of the shippons, wells, barns, hay lofts, 7 specimens were taken for bacterial examination.

Within 24 hours, there were seen little white colonies in the lactose agar plates, which drew out into short threads on touching with a platinum needle. Microscopic examinations showed the presence of a broad, short, rod-shaped bacterium, non-motile and easily stained. From the characters of this bacterium it was identified with certainty as *Bacterium aerogenes.*

On inoculating the bacterium into sterilized milk, the milk became ropy in 10 hours.

The 2 cows isolated from the shippon, after a sample had been taken, when placed in an uninfected place, gave, owing to the conditions of cleanliness, milk quite normal and in no way ropy. It thus seemed most probable that the trouble was due to a general infection of the water, shippons and hay lofts by *Bacterium aerogenes.* M. J. HARKINS.

BOTULISM: THE DANGER OF POISONING BY VEGETABLES CANNED BY THE COLD PACK METHOD. Ernest C. Dickson. Abst. from *Medical Record,* Vol. 92, No. 14, Oct. 6, 1917.—Ernest C. Dickson,

from a search of the literature and as a result of his personal investigations, finds that in all there have been at least twenty-two known outbreaks of botulism in the United States during the past twenty years, in which eighty-one persons have been ill and fifty-five have died, a mortality of 67.9 per cent. Of these twenty-two outbreaks, eighteen have occurred on the Pacific Coast. The author believes that there have been many similar outbreaks of botulism which have passed without recognition. An important feature of these cases is the relatively small number in which the poisoning was caused by food of animal origin. He has examined a considerable quantity of fruit canned by the cold pack method, in which fermentation has begun, and has found the *B. botulinus* present. Guinea pigs inoculated with cultures from this source died within twenty-four hours. The symptoms produced were identical with those caused by the toxin of *B. botulinus,* which is formed in meat broth. The writer urges that, in view of the widespread advice to can all the vegetables possible, and the distribution of directions for cold-pack canning, all such products be thoroughly heated before being eaten or even tasted. M. J. HARKINS.

—A TRIBUTE TO DR. COOPER CURTICE. I bow my head in reverence today in the presence of that splendid gentleman who was the father of tick eradication in the United States, and all of us believe he is greater, far greater, than many of the politicians of this country, because he is a man who has made two cattle to grow where only one grew before, Dr. Cooper Curtice of Washington. Take, for instance, my own State of Arkansas, with which I am familiar: within the last year we have cleaned up 18,000 square miles in the state from the tick, and this year, under the provisions of our tick eradication law, we propose to clean up 15,000 additional square miles of the tick. This means an addition of $1.50 per hundred to our meat products. It means that the loss of 13% of our cattle by ticks, which all of us suffer as a result of the tick, will be eliminated. So, my friends, Dr. Cooper Curtice of Washington, and the splendid gentlemen who have cooperated with him, deserve an incomparable debt of gratitude at the hands of this association.—*Governor Brough, of Arkansas, at the Fifth Annual Meeting, Southern Cattlemen's Association, 1917.*

ARMY VETERINARY SERVICE

THE ECONOMIC AND MILITARY NECESSITY OF AN ARMY VETERINARY SERVICE*

COLONEL J. J. AITKEN, Washington, D. C.

Since the United States ran her battle flag alongside those of the great civilized nations to the masthead of the battleship "HUMANITY" with the sworn object of fighting and exterminating that lawless, piratical craft, "BARBARISM", manned by those followers of Attila, the Central Empires; since that day the subject that has been uppermost in my mind, and doubtless also in the minds of many, if not all of you, has been: how can the profession we have the honor to represent do best service in this great crusade of today?

This crusade, as it has developed in magnitude, has shown itself to be one that calls for the very last ounce of organization and of physical and mental energy.

In the fighting zones in all its activities it is a war of trained experts, working in perfect coordination. This we know from personal experience, from the reports of eye witnesses, or from the press. Therefore, gentlemen, the question we have asked ourselves is not a hard one to answer.

The veterinary profession in this great land of freedom, at this critical moment of its history, can be of most use to its country in producing an organized veterinary service as part of the U. S. Army.

Such a service, to be effective, will require to be as much a part of the army as are now cavalry, artillery, and infantry; a trained disciplined service of officers and enlisted men organized into veterinary units of various kinds with specific duties to perform. The necessity for an organized veterinary service in an army of today is twofold. There is an economic necessity and there is a military necessity. This great crusade is using up so much of this world's wealth and material that the old slogan of "*The Best and the Most at Any Cost*" has been superceded by "*The Best and the Least Necessary, at the Smallest Cost*". We must not forget that all of us who rally round the old cry, "Be it, by ourselves wast-

*Read at the 10th Veterinary Conference, Ithaca, N. Y., Jan. 11, 1918.

ing, encouraging waste in others or even not preventing, to the best of our ability, waste of foodstuffs, raw material, transportation or horseflesh are materially assisting the common enemy''. The economic necessity of a veterinary service as part of an army of today lies in the fact that: it is only by the existence of such an organized, centrally controlled service that commanding officers of combatant units can have placed at their disposal, as advisers on all matters affecting the health of the animals of their units, capable veterinarians, working under an organized coordinated system. Without such advisers, economy in horseflesh cannot exist. This will be patent to all if they will consider for one moment the multiplicity of duties of the combatant officers of today and the limited knowledge of horseflesh that many newly commissioned officers possess.

It is only by an organized veterinary service that faults in animal management, common even today and to become increasingly common as men less and less acquainted with animal management are necessarily drafted into mounted branches, can be brought to the knowledge of the headquarters of formations, armies or the war department in time to prevent serious results; it is only by such a service that coordinated steps can be taken to rectify such faults.

Without such a service delay in diagnosing, in reporting, above all delay in taking coordinated and organized steps to control and eradicate equine contagious disease must result with appalling loss of efficiency, waste of public money, labor and material. Without such a service the expensive treatment of sick, lame and injured animals haphazardly, without proper appliances and with an untrained staff, in their own lines or in hopelessly situated, equally hopelessly equipped so-called veterinary hospitals, must continue to exist. With such a service, however, all but the most minor cases can be treated in bulk, by the thousands instead of by tens and hundreds, in large well built, properly ventilated, properly situated, thoroughly equipped and efficiently staffed veterinary hospitals.

It does not require much considering to realize that in such hospitals it is possible to provide specialists, appliances, trained staffs, and a system that it is utterly impossible to provide for hundreds of small so-called hospitals that exist when no organized veterinary service is in being, nor is it difficult to realize that one system is criminally wasteful and the other economical.

Without such a service coordinated steps cannot be taken to collect reports and obtain information on the hundred and one matters affecting animal health in a military service, nor to investigate outbreaks of disease and the frequency of injuries affecting animal efficiency. Without such a service scientific investigation and experimental work with a view to eradicating harmful courses must be incoordinate and wasteful.

Without such a service no efficient control can be exercised over young and inexperienced veterinarians, no adequate support can be given to those veterinarians who, in the performance of their duties, find difficulties placed in their way. No system of praise for the silent, conscientious, hard worker, blame for the bluffer, and elimination of the vicious, the ignorant and the pseudo-veterinarian, can be created.

The reasons I have just outlined to you showing the necessity for an organized veterinary service all have an economic "*raison d' etre*". In that they affect efficiency, however they are also military reasons. There are also a few purely military reasons that show the necessity for an organized veterinary service in an army of today. The efficiency of a mobile unit depends largely on the efficiency of its means of mobility, be such the men's feet, the mule, the horse or the engine driven car. An organized veterinary service can materially assist military efficiency by removing, with the least loss of the fighting strength of a unit, all animals that retard mobility, either by their inability to move at a normal pace or by their presence on the feeding strength of a unit when in an unworkable condition, a presence that is a high factor of inefficiency in that it is a cause of great loss of ton-mileage on already congested lines of communications often far up into the zone of operation.

The fact that all sick, lame and injured animals, excepting those suffering from disease and injury of the most trivial character, must be at once removed from units in the zone of operation is self evident. Further, no one will dispute the fact that officers and men must be detailed to look after and restore to usefulness at the earliest possible moment these temporarily, from a military point of view, useless animals. To attend on them from the moment they become useless, be it from a shell wound sustained in the actual firing line, a kick sustained in the wagon line or disease or injury acquired in any way. What branches of the service can look after these animals with the least waste of fighting efficiency? The

officers and enlisted men of corps and units on whose expert training as cavalrymen, artillerymen, machine-gunners, mine-layers, bombers, bayonet fighters, medical attendants and quartermasters time, labor and money has been expended? No, they are wanted and wanted badly at their own duties, not wanted for a few hours a day or for a few days a week but all day and all the week.

These duties can only be performed economically and with least loss to the fighting efficiency of the army by an adequate military veterinary service, organized as a trained and disciplined entity, officered by its own officers, ranking according to the appointments they are selected to fill, with grades equivalent to those of the holders of similar appointments in other branches of the army. A service with one object and one object only in front of it, "EFFICIENCY".

Lieut. Joseph F. Derivan, Veterinary Reserve Corps, was born in New Vienna, Ohio, February 20, 1891. He completed his education in the classical course given by the New Vienna schools and graduated in May, 1910. He then attended two sessions at St. Mary's College, Dayton, Ohio, taking a course in mechanical engineering, but did not care to follow the engineering profession, so entered the Veterinary Department of the University of Ohio in the fall of 1912, graduating in June, 1914. From then until March, 1916, he practiced with an experienced practitioner of veterinary medicine and entered into a partnership with him.

When the call for veterinarians went out Doctor Derivan was one of the first to respond, believing it his duty to do his bit even though he sacrificed a good practice. Acting on this patriotic impulse, he put in his application for the Veterinary Reserve Corps and was commissioned June 20, 1917, called to active service August 2, 1917, and detailed to take a special course in the inspection of meats, milk and other food products. This was a course to prepare men for the special work of the Army, and was most thorough and exhaustive in the study of food preparation in all its phases. After this thorough special preparation Doctor Derivan was assigned to the 88th Division at Camp Dodge, Iowa, and put in charge of the inspection of meat and meat products, milk and milk products, etc.

In the performance of this duty Lieut. Derivan, aided by two trained assistants, inspects all meat issued, paying especial atten-

tion to the proper sanitary handling of fresh beef. Canned and cured meats are inspected on receipt by the Subsistence Department and again on issue to the troops. All deliveries made to organizations, by parties other than the contractor, are inspected to ascertain source, destination, quality, weight and price charged. Each inspection is marked by a special stamp showing the name of

LIEUT. JOSEPH F. DERIVAN

the inspector responsible. Frequent visits are made to the kitchens of the various organizations and instructions given as to the proper care and handling of food.

Dairies delivering milk to the division are inspected with special attention to sanitary conditions and quality of products.

It is needless to say that Doctor Derivan and his assistants are very busy. However, Doctor Derivan has found time to study

several subjects taught at the officers' classes, including Field Service Regulations, Protection Against Gas Attacks, and French.

Lieut. Derivan, incidentally, has been recommended for promotion.

—THE A. V. M. A. AND ARMY VETERINARY SERVICE. The veterinarians of the 88th Division, National Army, have all applied for membership to the American Veterinary Medical Association and subscribed for the *Journal* of the association. It is a pleasure to have such a number of bright, intelligent young men show a desire to enter their names on the rolls of our association because it creates a feeling among the older members, who have fought hard, at times, to keep it going; and even harder at other times for recognition among the honored professions; that the younger members of the profession recognize and appreciate these efforts and are willing to step forward and aid in keeping the association and its official organ on a sound and stable basis. Younger members must take up the burdens as the old war horses show inclination to retire. When men enter the lists early in life and receive aid and coaching from the older members before assuming the serious responsibilities things pertaining to as great an organization as the A. V. M. A. are bound to move more smoothly and better for all concerned. We welcome the veterinary staff of the 88th Division, National Army, of Camp Dodge, Iowa, en masse: Lieut. Ralph A. Moye, Lieut. Homer S. Perdue, Lieut. Lawrence A. Mosher, Lieut. Joseph F. Derivan, Lieut. Alverda J. Dawson, Lieut. Russell Elson, Lieut. Raymond Hofferd, Lieut. Ralph B. Stewart, Lieut. Floyd S. Sharp, Lieut. Lester L. Jones.

—Dr. W. K. Herbott, formerly at Camp Shelby, Miss., has been promoted to a first lieutenancy and is now stationed with the 77th Field Artillery at Camp Greene, Charlotte, N. C.

—Captain R. J. Foster, formerly in the Philippines, is stationed at Fort Riley, Kansas, as Instructor in the Medical Officers' Training Camp.

—Second Lieutenant L. J. Kepp has been transferred from Camp Sevier, Greenville, S. C., to the Auxiliary Remount Depot at Camp McClellan, Anniston, Ala.

—Second Lieutenant R. O. Stott, formerly at the Remount Station at Fort Bliss, Texas, is now stationed with the 17th Cavalry at Camp Jones, Douglas, Arizona.

—Major C. J. Marshall has received a commission as Lieutenant Colonel of the Veterinary Corps.

—Major George A. Hanvey, formerly at Remount Station, No. 2, Fort Sam Houston, Texas, is located as Division Veterinarian, 84th Division, Camp Taylor, Ky.

ASSOCIATION MEETINGS

LOS ANGELES VETERINARY MEDICAL ASSOCIATION

At the annual meeting of the Los Angeles Veterinary Medical Association held at the Hollenbeck Hotel, January 16, 1918, J. B. Bell of Pasadena was elected president; O. J. Osborne of Whittier, vice president; and J. A. Dell of Los Angeles, secretary-treasurer.

Drs. L. M. Hurt, O. J. Osborne and J. B. Bell gave a very complete report of the recent Short Course for Veterinarians held at Davis, Calif., the discussion of which, together with case reports, took up the evening. J. A. DELL, Sec'y-Treas.

PENNSYLVANIA STATE VETERINARY MEDICAL ASSOCIATION

The Pennsylvania State Veterinary Medical Association held its thirty-fifth Annual Meeting at Harrisburg, January 22 and 23. In spite of the extremely bad conditions of the weather and traveling, the meeting was very well attended.

The following program was rendered:

Tetanus—Its Prevention and Treatment.....H. E. Bender
Cattle Practice and Some of the Conditions We Are Called Upon to Treat
.....S. G. Hendren
Hemorrhagic Septicemia—Its Diagnosis and Control.....
.....J. B. Hardenbergh and Fred Boerner, Jr.
Hemorrhagic Septicemia as Observed by the Practitioner.....
.....W. R. Piersol and Joseph Johnson
Relationship Between the County Agent, Veterinarian and Farmer.....
.....F. P. Weaver, Asst. State Leader of County Agents
The Biological Treatment of Infectious Abortion of Cattle (Bang's Disease) with Special Reference to the Use of a Living Bacterial Vaccine.....John Reichel and Malcolm J. Harkins
Treatment of Sterility and Contagious Abortion of Cattle (Demonstrated with Specimens).....W. H. Ridge
Experience Gained by Tuberculin Testing.....H. C. Reynolds
Tuberculosis Eradication.....J. A. Kiernan
Chief, Division Tuberculosis Eradication, Bureau of Animal Industry
Usefulness of an Efficient Army Veterinary Service.....
.....Lieutenant Colonel J. J. Aitken, British Army Veterinary Service
What the United States Army Has Done and Is Doing to Meet the Needs of an Army Veterinary Service.....Major D. S. White
Dean, Veterinary School, Ohio State University

Parasites of Sheep.....I. D. Wilson
Sheep Pests, Parasitic and Predacious.....B. M. Underhill
A Day in General Practice.....F. U. Fernsler

The papers by Lieutenant Colonel Aitken and Major White, relative to what is being done in the Army Veterinary Service, were especially interesting and instructive.

A banquet was held at the Harrisburg Club, at the conclusion of the first day's meeting, in honor of Lieutenant Colonel Aitkin, of the British Army Veterinary Service, and Majors Marshall and White, of the United States Army Veterinary Corps. President McCarthy, as toastmaster, called on Majors Marshall and White, and Lieutenant Colonel Aitkin, Doctor Sparks, President of the Pennsylvania State College; Mr. E. S. Bayard, Editor of the National Stockman and Farmer; Dr. W. Horace Hoskkins, Dean of the New York Veterinary College; and Dr. J. A. Kiernan, Chief of the Division of Tuberculosis Eradication of the Bureau of Animal Industry. The banquet was an extremely enjoyable one, and one that will not soon be forgotten.

The officers elected for the ensuing year are as follows: President, Dr. Charles W. Boyd; vice presidents, Drs. W. E. Wright, D. E. Hickman, and A. R. Potterger; treasurer, Dr. Thomas Kelly; recording secretary, Dr. I. D. Wilson; corresponding secretary, Dr. T. E. Munce; trustees, Drs. John Reichel, M. E. Patrick, Edwin Hogg, F. U. Fernsler, and C. B. Palmer.

Three thousand dollars was the estimate of the minimum amount that would be needed for the 1918 meeting of the American Veterinary Medical Association at Philadelphia. This amount is being raised by appropriations from the State and various sectional associations, and also by private subscriptions.

I. D. Wilson, Recording Secretary.

VETERINARY CONFERENCE

The tenth annual conference for veterinarians was held at the New York State Veterinary College at Ithaca, N. Y., on January 10 and 11. More than a hundred visiting veterinarians attended.

The Thursday morning session was opened with a paper, "The Veterinarian and Conservation", by Dr. V. A. Moore. He showed that the veterinarian has a great field open to him in preventive medicine, and that the war has widened this field tremendously. He pleaded for the closest cooperation between veterinarian and ani-

mal owner, in order that the prevention of disease should help to conserve animal life.

Dr. S. A. Goldberg gave an instructive illustrated talk on "Lesions of Spavin and Their Significance". He showed various ways in which spavins originate, and one could not see the slides without being reminded constantly of the importance of rest in the treatment of spavins of recent origin.

Dr. C. E. Hayden read a paper on "The Digestive Action of Mouth Secretions of the Horse", in which he reviewed in thorough fashion the work on this subject, pointed out sources of error in conducting these researches, and gave a synopsis of the results of his own work.

Dr. U. G. Houck, representing the Bureau of Animal Industry, outlined in a clear and interesting manner some of the work the Bureau is doing to conserve animal life and promote animal industry. He referred to the work in connection with the control of tuberculosis and hog cholera, and described results obtained in the eradication of sheep mange, cattle mange, and Texas fever. He also mentioned projects to promote dairying, and the use of dairy products as substitutes for meat.

Dr. R. R. Birch presented a paper on "Garbage Feeding and the Care of Garbage Fed Swine", discussing briefly methods of city garbage disposal, giving data on the subject secured from the mayors of fifty cities in New York, and pointing out financial opportunities that garbage feeding offers. He also touched on methods of swine husbandry in establishments where garbage is fed, and outlined a system for maintaining cholera immune herds.

The Thursday afternoon session was one in which unusual interest was manifested. It consisted of a symposium on retained placenta. Dr. D. H. Udall discussed treatment and substantiated his remarks with a number of case reports. Dr. W. L. Williams discussed consequences, referring especially to the resulting sterility. The subject was further discussed in interesting fashion by Dr. G. A. Knapp, who described some of his cases and mentioned the need for general treatment in weak subjects; by Dr. P. J. Axtel, who raised the question whether rupture of the uterus, supposed to be due to injudicious douching, might not, in reality, be due to previous necrosis of the wall; by Dr. Otto Faust, who asserted that no two cases were alike, and by Dr. J. L. Wilder.

Although the treatment of retained placenta is a subject on

which widely divergent views have been held, it was apparent that the men who took part in the discussion were well agreed on certain essentials. These included manual removal only when the membrane separated readily from the cotyledons, judicious but thorough douching with weak antiseptic or salt solutions, provision for a return flow of the douching fluid, and complete emptying of the uterus following each douche. Those who had tried emollients (petrolatum, olive oil, lard) following douching had secured excellent results.

The evening program opened with an address by Dr. J. G. Schurman, president of the university, who spoke of the work of the State Food Commission, of which he is a member. President Schurman gave his hearers an interesting insight into the duties and methods of the Commission, and explained clearly some of the "whys and wherefors" of food conservation. He said that in this war, as in no other, a little sacrifice by those at home would go far to strengthen the hand of our army on the firing line.

Dr. F. Torrance, Canadian Veterinary Director-General, and president of the American Veterinary Medical Association, addressed the conference on "Live Stock Production and the Veterinarian", giving figures to support his assertions because "figures don't lie", and telling where he obtained his figures because "liars will figure". Dr. Torrance always has something to say when he speaks, and this instance was no exception.

On Friday morning Dr. W. L. Williams read a paper entitled "Tuberculosis of the Generative Organs". He showed that, in cattle, tuberculosis of the reproductive organs is by no means uncommon, traced some of its consequences, and referred to the danger of transmitting the disease from one sex to the other during coition.

Dr. J. N. Frost, in the absence of Dr. John Adams, who was to discuss the use of the actual cautery, gave a talk on the subject of quittor. Dr. Frost described an operation in which the lateral cartilage is exposed by two incisions—one through the skin above the coronary band, and the other through the horny wall and sensitive laminae below—the coronary band itself being left intact.

Major David S. White, from the Surgeon-General's office, Washington, discussed the organization of a veterinary corps in the new National Army. Major White, always an interesting speaker, gave an instructive outline of some of the difficulties encountered, and the results so far obtained in building up an effective army veterinary service.

Colonel J. J. Aitken, veterinary adviser from overseas, spoke on "The Economic and Military Necessity of an Army Veterinary Service". The speaker recounted some of the mistakes England had made in failing to provide veterinary service in her army, and mentioned some of the consequences growing out of this neglect. He asserted that horses are necessary in a modern army, and being subjected to severe use are in constant need of capable veterinary supervision. In this supervision, he said, preventive medicine and correct methods of handling are far more important than treatment of disease.

Following a luncheon served at the college, the afternoon was given over to clinics and post mortems. The large animal clinic, conducted by Dr. Frost, included an operation for poll-evil and a demonstration of a new operation for quittor. There was also a case of sarcoptic mange from which scrapings and microscopic examinations were made. The small animal clinic, in charge of Dr. Milks and Dr. Muldoon, had on hand for inspection cases of sarcoptic mange, follicular mange, acne, gastritis and otorrhea. Among the post mortems performed by Dr. Goldberg and Dr. Hagan was one of special interest, in which the subject was a horse showing generalized carcinoma.

An informal dinner, instead of the customary banquet, was served at the Ithaca Hotel in the evening. Following the dinner Dr. Williams introduced Dr. P. A. Fish, who, in spite of vigorous protests on his part, had been conscripted as toast master. Following the introduction of the toast master Dr. V. A. Moore proposed a toast to the President of the United States, and Dr. Cassius Way proposed one to "our allies". Those assembled drank the toasts with enthusiasm—and water.

President Schurman, the first speaker of the evening, discussed the probable effects the war would have on colleges, saying that the war debt would be so large and necessary taxes so high that every school supported by public funds would be subjected to a most searching examination. Some, he said, would be weighed and found wanting, and unnecessary duplication would not be tolerated.

Colonel Aitken, in spite of a seeming temporary embarassment due to "a blighter across the table taking notes", gave a short but well received address on "Discipline". He referred briefly to the need for discipline in the army, to certain misunderstandings regarding its enforcement, and to its place in the habits of a soldier.

Dr. Torrance told some things Canada has done in the war; Major White spoke of the veterinary corps in the army, asked that the work of organization should be judged by its accomplishments rather than by its failures, and asserted that quality of service is the criterion by which all candidates for promotion are judged; Dr. Frank H. Miller recounted some of his pleasant experiences as a trustee of the university; Dr. A. S. Downing, of the State Department of Education, defined—and illustrated—in an inspiring address, some of the advantages of a classical education and patriotism, and Dr. V. A. Moore spoke of the responsibilities of veterinarians remaining in civil life.

The "Evening Song" closed the program. R. R. B.

COLORADO VETERINARY MEDICAL ASSOCIATION

The annual meeting of the Colorado Veterinary Medical Association was held January 24 in the rooms of the Gentlemen's Riding and Driving Club at Denver. In point of attendance and interest shown it was well up with previous meetings of this organization.

The report of the secretary showed that out of a membership of fifty-four, eight men had already joined the colors. Four new men were elected to membership. An amendment to the constitution was presented which will provide for raising the dues from two to three dollars a year. It will also do away with the clause in our by-laws which requires a veterinarian to possess a license to practice before he can obtain membership in the association. It was decided to remit the dues to those members who are in the service of the United States, so long as they remain in such service.

On reading the communication from the Relief Committee of the A. V. M. A., it was ordered that the association contribute $100 to the Relief Fund, $42 of this was raised by subscription at the meeting.

Dr. R. F. Bourne presented an excellent paper on "Pyemic Arthritis in Foals". In the discussion which followed, Dr. Hermann said that he found antistreptoccocic serum of value in many cases, and especially so in those where it promptly reduced the temperature.

Dr. Bird spoke of an outbreak of contagious abortion in mares which occurred in Montana years ago. Associated with this

was a considerable amount of joint trouble in those foals that were born alive.

Dr. G. H. Glover discussed especially three new poisonous plants, one the whorled milkweed (*Asclepias verticillata*), another the spreading nightshade (*Solanum triflorum*), and the third the two-grooved milk vetch (*Astragalus bisulcatus*), on all of which much suspicion has been cast of late. The clinical evidence of their poisonous properties was very strong.

Dr. Schoenleber, who had recently come to Denver to make his home, made his talk more of a patriotic nature, urging that we do all that we can to aid the government in the present crisis.

Dr. I. E. Newsom reported on the use of hemorrhagic septicemia vaccine on 6800 lambs.

The election of officers resulted in the retention of those who had served during the previous year, with the exception of the second vice president who had removed from the state. Dr. O. B. Morgan of Rocky Ford was elected to fill the place.

I. E. Newsom, Secretary.

CONFERENCE ON TICK ERADICATION

A conference on tick eradication, participated in by practically all of the B. A. I. employees devoting their time to that line of work, from all of the quarantined states, was held in New Orleans January 15-18.

The purpose of the conference was to prepare the men to do better work in their respective territorities, as the Government is making a great drive against the cattle fever ticks.

The Florida delegation put a lot of "pep" into the conference by appearing in the assembly hall the first morning carrying pennants from their official station cities. As there were no decorations in the room and no other delegations had pennants, they proceeded to use those with some American flags to decorate the chandeliers, and made them the permanent decorations for the conference.

They also opened the first session with their official yell, which was as follows:

Who are we? B. A. I. Boys.
What do we do? Dip That Tick.
What for? To Eradicate Disease.
Where? In F-L-O-R-I-D-A, Florida.

As Lake County was the first county in Florida to vote for compulsory dipping of cattle, under the new law, the election taking place on the 15th, the delegation had results wired to them. When the telegram was read to the conference they unburdened themselves of the following yell, which was greeted by loud applause:

Ticks are on the run.
Lake County went over the top,
Seven to one.
Why shouldn't we holler,
With Orange, Escambia and Palm Beach to follow?
Why shouldn't we yell?
Two years more and all the ticks will be in hell.
Florida, Florida.

Dr. E. M. Nighbert, inspector in charge, in Florida, speaking on the subject, "Beginning Work in a New State," showed the remarkable progress which has been made since the office was established in Jacksonville during October, 1916. One county has been cleaned up and released from quarantine and 30 other counties have made appropriations for building dipping vats and cooperating with state and federal authorities, representing a total of about two-thirds the entire area of the state.

He also stated that the preliminary work has been done, from the best information he could obtain, at a less proportionate cost to the government than in any other state.

Dr. R. A. Ramsey, Chief Tick Eradication Division, B. A. I., gave a very forceful talk on "Organization of the Bureau and the Need for Cooperation Between Its Employees".

Among the many important subjects discussed by experienced men were the following: "Securing the Cooperation of the Large Cattle Owner"; "Securing the Cooperation of the Small Cattle Owner"; "Necessity of Dipping Cattle Every Fourteen Days"; "Tick Eradication on the Open Range"; "Getting Cattle Out of Swamps", etc. Those were also discussed in a number of three-minute talks by men appointed by the program committee.

The question box was one of the factors in bringing the problems of the workers to the attention of the conference. Each member was urged to ask questions bearing on his particular problems, and those were answered by several who had been through similar experiences. By getting a number of ideas on each problem, the work will be simplified, as varying conditions can be met by the proper solution.

Among the speakers representing cooperative agencies were: Dr. C. A. Cary, State Veterinarian, Alabama; Dr. Peter F. Bahnsen, State Veterinarian, Georgia; Dr. R. M. Gow, State Veterinarian, Arkansas; and R. W. Storrs, member of the Florida State Live Stock Sanitary Board.

Dr. W. K. Lewis, inspector in charge in South Carolina, and Dr. E. Pegram Flower, State Veterinarian, Louisiana, were prevented from attending by illness. The conference sent each a telegram of sympathy and good wishes.

Some of the workers took occasion to urge upon all who were not members of the American Veterinary Medical Association the importance of joining their respective state chapters.

A. A. Coult.

SOUTHERN TIER VETERINARY MEDICAL ASSOCIATION

The fourth semi-annual meeting of the Southern Tier Veterinary Medical Association was held at Owego on December 29. In spite of the inclement weather there were twenty-two members and twelve visitors in attendance.

A clinic was held in the morning at the hospital of Dr. E. F. Vorhis. Dr. J. N. Frost operated on a colt that was supposed to have been a cryptorchid, but which proved to be practically normal. Dr. A. W. Baker castrated an old stallion, standing operation. There was presented for examination a horse showing numerous indurated enlargements in the submaxillary region, and downward toward the chest. The animal was examined by Dr. Frost, who pronounced the case inoperable.

The afternoon session was opened by Dr. V. A. Moore, who discussed the hog cholera situation in New York, calling special attention to the obligation resting on veterinarians to be prepared to give effective aid in all outbreaks of the disease. He also outlined a plan by which the Bureau of Animal Industry will aid the state officials in hog cholera control work. The paper was discussed briefly by Dr. W. L. Clark and Dr. R. R. Birch.

Dr. W. L. Williams gave an interesting talk on calf scours and pneumonia, in which he touched on recent researches regarding the etiology, channels of infection, prophylaxis and treatment of this baffling disease. According to Dr. Williams, the colon ba-

cillus is often incriminated as a cause of white scours, but there are other organisms that are not wholly exonerated. Essential points emphasized in prophylaxis and treatment included sexual hygiene for the mother, and liberal doses of white scour serum for sick and exposed calves.

Dr. Otto Faust read an instructive paper on dog distemper in which he called attention to varying degrees of virulence observed in different outbreaks, and related some of his experiences with serums and vaccines in treating this disease. About the best he could say was that these products probably did no harm, and he seemed to have had almost equally disappointing results with echinacea. Dr. Faust also stated that he left his distemper patients out of doors as much as possible, a practice which did not seem to find much favor in the experience of others who discussed the paper.

Dr. H. J. Milks led the discussion of Dr. Faust's paper. He emphasized the fact that there is no specific for dog distemper, and pointed out that abortive treatment is rarely successful. He stated further that symptomatic treatment was the most satisfactory, and outlined briefly the handling of conjunctivitis, heart weakness, diarrhea and nervous symptoms often associated with the disease. Dr. W. E. Muldoon discussed the differential diagnosis, calling attention to the fact that we should not be too hasty in making a diagnosis of distemper every time a dog with fever, gastric disturbances, or profuse lachrymation is brought before us.

The evening session was opened by Dr. G. A. Knapp, who gave an interesting talk on "Some Experiences in Cattle Practice". Dr. Knapp gave some very instructive case reports, which were freely discussed by several of the members present. The remainder of the evening was given over to voluntary case reports and discussions in which all took part. R. R. Birch, Secretary.

LIVE STOCK SANITARY BOARD OF NORTH DAKOTA

At the last state meeting of the Live Stock Sanitary Board of North Dakota the following resolutions were passed:

Whereas, It has pleased The Almighty to call from our midst our friend and co-worker, Dr. R. H. Treacy, the members of the State Live Stock Sanitary Board of North Dakota feel that a great loss has been incurred by the live stock interests of this State, and

it seems fitting that this board record its feeling of grief and deep regret at his loss; therefore, be it

Resolved, That the death of our friend and associate is greatly deplored by the members of this board, and we wish to extend to the family of Dr. R. H. Treacy the assurance of our heartfelt sympathy and condolence in our common bereavement, and that a copy of these resolutions be forwarded to the family of Dr. R. H. Treacy, and be spread upon our records.

WHEREAS, Through the death of Dr. A. D. Melvin, Chief of the Bureau of Animal Industry, the members of the State Live Stock Sanitary Board of North Dakota feel that the live stock interests of the Nation have lost a most valuable friend and executive; and

WHEREAS, The interest always taken by Dr. A. D. Melvin in the problems of live stock sanitary control work in this state was so much appreciated that this board deems it fitting to record its feeling of regret at his loss; therefore, be it

Resolved, That the death of Dr. A. D. Melvin is very much deplored by the members of the State Live Stock Sanitary Board of this State, and that a copy of these resolutions be spread upon our records.

MICHIGAN MILK AND DAIRY INSPECTORS' ASSOCIATION

The following program was prepared for the fourth annual meeting of the Michigan Milk and Dairy Inspectors' Association at Saginaw, Mich., Feb. 6, 1918:

President's Short Address.....Dr. H. E. States, V.M.D., Detroit
(Director Dairy and Food Dept., Detroit Board of Health)
Contagious Abortion.....Dr. Ward Giltner, East Lansing
Regulations and Compensation Paid for Diseased Animals.....
.....Dr. H. H. Halliday, Lansing
Milk Transportation.....F. W. Fabian, East Lansing
Stable Disinfection.....Dr. H. Preston Hoskins, Detroit
Tuberculosis Eradication as Carried Out by the U. S. Bureau of Animal Industry, Michigan State Live Stock Commission Cooperating with the Breeders of Pure-Bred Cattle.....Dr. T. S. Rich, Detroit
Milk and Health.....Dr. William DeKleine, Flint
City Milk Plant Operation.....E. C. Krehl, Detroit
Work of the Recent Milk Commission.....N. P. Hull, Lansing
Practical Production of Certified Milk.....Dr. J. R. Wardle, Mt. Clemens
Business Meeting
6:30 P. M. the regular Michigan Dairymen's Association Banquet

H. E. STATES.

PRACTITIONERS' SHORT COURSE IN VETERINARY MEDICINE, UNIVERSITY OF CALIFORNIA

The following program was prepared for the Practitioners' Short Course at the University Farm, Davis, Calif., Dec. 26-29, 1917:

WEDNESDAY, DECEMBER 26

1:15 P. M. Address by an officer of the University
1:30 P. M. Response by a California veterinarian
1:45 P. M. Demonstration in judging farm animals, presenting some of the best breeds and types in California.....Faculty of the Division of Animal Husbandry
3:20 P. M. Demonstration of technic of tuberculin injection by intradermal method.....A. L. O'Banion
3:40 P. M. Lecture and demonstration of methods of general anesthesia and operative procedure.....John W. Adams and Assistants
7:30 P. M. Lecture: Principles of Immunity and Their Application in Veterinary Medicine.....Adolph Eichhorn

THURSDAY, DECEMBER 27

9:00 A. M. Symposium on sterility in cattle, with special reference to experiences during the past year.....Faculty of the Division of Dairy Industry
10:30 A. M. Recent Improvements in the Prevention and Cure of Blackleg (Discussion led by Fred Wood).....Adolph Eichhorn
1:30 P. M. Continuation of demonstration in judging breeds and types of farm animals.....Faculty of the Division of Animal Husbandry
3:00 P. M. Lecture and clinical demonstration: Diseases of the Foot .....John W. Adams and Assistants
7:30 P. M. Addresses

FRIDAY, DECEMBER 28

9:00 A. M. Lecture on operative surgery, including operative demonstration.....John W. Adams
11:00 A. M. Lecture: The Carrier Problem in Infectious Diseases .....K. F. Meyer
1:30 P. M. Paper: The Serum Treatment of Hemorrhagic Septicemia in Cattle (Discussion led by K. F. Meyer) W. B. Mack and Edward Records
3:00 P. M. Demonstration of technic of intravenous administration of serum to cattle.....Veterinarian from University of Nevada
3:15 P. M. Demonstration of pathological specimens and discussion of autopsy findings.....K. F. Meyer in cooperation with H. H. Hicks
7:30 P. M. Adjourned annual meeting of the California State Veterinary Medical Association

SATURDAY, DECEMBER 29

9:00 A. M. Demonstration of technic of manufacture of dairy products
10:00 A. M. The Prevention of Anthrax (Discussion led by Charles Keane).....Adolph Eichhorn
1:30 P. M. Interpretation of the intradermal tuberculin reaction (Discussion led by Jacob Traum).....A. L. O'Banion
2:30 P. M. Surgical exercise on anaesthetized horse, under the direction of.....Dr. John W. Adams

In addition to the above program a number of clinical and demonstrational features of interest to practitioners and veterinary inspectors were arranged, among which may be mentioned:

it seems fitting that this board record its feeling of grief and deep regret at his loss; therefore, be it

Resolved, That the death of our friend and associate is greatly deplored by the members of this board, and we wish to extend to the family of Dr. R. H. Treacy the assurance of our heartfelt sympathy and condolence in our common bereavement, and that a copy of these resolutions be forwarded to the family of Dr. R. H. Treacy, and be spread upon our records.

WHEREAS, Through the death of Dr. A. D. Melvin, Chief of the Bureau of Animal Industry, the members of the State Live Stock Sanitary Board of North Dakota feel that the live stock interests of the Nation have lost a most valuable friend and executive; and

WHEREAS, The interest always taken by Dr. A. D. Melvin in the problems of live stock sanitary control work in this state was so much appreciated that this board deems it fitting to record its feeling of regret at his loss; therefore, be it

Resolved, That the death of Dr. A. D. Melvin is very much deplored by the members of the State Live Stock Sanitary Board of this State, and that a copy of these resolutions be spread upon our records.

MICHIGAN MILK AND DAIRY INSPECTORS' ASSOCIATION

The following program was prepared for the fourth annual meeting of the Michigan Milk and Dairy Inspectors' Association at Saginaw, Mich., Feb. 6, 1918:

President's Short Address.....Dr. H. E. States, V.M.D., Detroit
(Director Dairy and Food Dept., Detroit Board of Health)
Contagious Abortion.....Dr. Ward Giltner, East Lansing
Regulations and Compensation Paid for Diseased Animals.....
.....Dr. H. H. Halliday, Lansing
Milk Transportation.....F. W. Fabian, East Lansing
Stable Disinfection.....Dr. H. Preston Hoskins, Detroit
Tuberculosis Eradication as Carried Out by the U. S. Bureau of Animal Industry, Michigan State Live Stock Commission Cooperating with the Breeders of Pure-Bred Cattle.....Dr. T. S. Rich, Detroit
Milk and Health.....Dr. William DeKleine, Flint
City Milk Plant Operation.....E. C. Krehl, Detroit
Work of the Recent Milk Commission.....N. P. Hull, Lansing
Practical Production of Certified Milk.....Dr. J. R. Wardle, Mt. Clemens
Business Meeting
6:30 P. M. the regular Michigan Dairymen's Association Banquet

H. E. STATES.

PRACTITIONERS' SHORT COURSE IN VETERINARY MEDICINE, UNIVERSITY OF CALIFORNIA

The following program was prepared for the Practitioners' Short Course at the University Farm, Davis, Calif., Dec. 26-29, 1917:

WEDNESDAY, DECEMBER 26

1:15 P. M. Address by an officer of the University
1:30 P. M. Response by a California veterinarian
1:45 P. M. Demonstration in judging farm animals, presenting some of the best breeds and types in California.....Faculty of the Division of Animal Husbandry
3:20 P. M. Demonstration of technic of tuberculin injection by intradermal method.....A. L. O'Banion
3:40 P. M. Lecture and demonstration of methods of general anesthesia and operative procedure.....John W. Adams and Assistants
7:30 P. M. Lecture: Principles of Immunity and Their Application in Veterinary Medicine.....Adolph Eichhorn

THURSDAY, DECEMBER 27

9:00 A. M. Symposium on sterility in cattle, with special reference to experiences during the past year.....Faculty of the Division of Dairy Industry
10:30 A. M. Recent Improvements in the Prevention and Cure of Blackleg (Discussion led by Fred Wood).....Adolph Eichhorn
1:30 P. M. Continuation of demonstration in judging breeds and types of farm animals.....Faculty of the Division of Animal Husbandry
3:00 P. M. Lecture and clinical demonstration: Diseases of the Foot.....John W. Adams and Assistants
7:30 P. M. Addresses

FRIDAY, DECEMBER 28

9:00 A. M. Lecture on operative surgery, including operative demonstration.....John W. Adams
11:00 A. M. Lecture: The Carrier Problem in Infectious Diseases.....K. F. Meyer
1:30 P. M. Paper: The Serum Treatment of Hemorrhagic Septicemia in Cattle (Discussion led by K. F. Meyer) W. B. Mack and Edward Records
3:00 P. M. Demonstration of technic of intravenous administration of serum to cattle.....Veterinarian from University of Nevada
3:15 P. M. Demonstration of pathological specimens and discussion of autopsy findings.....K. F. Meyer in cooperation with H. H. Hicks
7:30 P. M. Adjourned annual meeting of the California State Veterinary Medical Association

SATURDAY, DECEMBER 29

9:00 A. M. Demonstration of technic of manufacture of dairy products
10:00 A. M. The Prevention of Anthrax (Discussion led by Charles Keane).....Adolph Eichhorn
1:30 P. M. Interpretation of the intradermal tuberculin reaction (Discussion led by Jacob Traum).....A. L. O'Banion
2:30 P. M. Surgical exercise on anaesthetized horse, under the direction of.....Dr. John W. Adams

In addition to the above program a number of clinical and demonstrational features of interest to practitioners and veterinary inspectors were arranged, among which may be mentioned:

Veterinary Practitioners' Short Course, University of California Farm at Davis, Dec. 26-29, 1917

A demonstration of immunization of hogs to hog cholera and exhibition of up-to-date immunizing equipment.

A collection of pathological tissues, including frozen specimens contributed by the U. S. Bureau of Animal Industry Inspectors of San Francisco.

An exhibit showing poultry disease investigations carried on at the University Farm by J. R. Beach.

There was an attendance of 86, representing veterinarians from six states.

TIPPECANOE VETERINARY MEDICAL ASSOCIATION

The February meeting of the Tippecanoe Veterinary Medical Association was held on the 13th, with 31 veterinarians present. The discussion on sheep diseases and the morning and evening talk on handling, feeding and management of sheep by Professor H. E. Allen of Purdue University proved to be especially interesting.

The sterility operation performed on two cows by Dr. W. B. Craig, Dean of the Indiana Veterinary College, was another especially good feature of the program.

Dr. J. L. Kixmiller of Logansport read a paper on contagious abortion of cattle. It was one of the best papers ever read before the association. If all members will try and contribute to the association as Dr. Kixmiller has done we are bound to succeed.

The members of the association feel deeply indebted to Dr. Craig and Professor Allen for their generous services which have largely made the organization a success.

Dr. J. C. Rodger of Anderson and Dr. R. C. Julien of Delphi were unable to take part in the program owing to sickness.

It was unanimously agreed by the members of the organization to hold the next meeting the first part of April. The busy season of the year was considered, but it was the general opinion of all members that we should hold occasional meetings and discuss war time problems and keep mobilized to fight the infectious diseases and in that way show our appreciation to the members of our profession who have crossed the water to fight our battles.

PROGRAM

10:00 A. M. General Discussion on Sheep Diseases
11:00 A. M. Practical Suggestions on the Handling of Sheep.....
.....Prof. H. E. Allen, Purdue
1:00 P. M. Sterility Operation on Three Cows.....Dr. W. B. Craig
(Dean Indiana Veterinary College)

Methods Used in Collecting Blood from Cows for Agglutination Test....
.....Dr. L. C. Kigin
Demonstration of the Agglutination Test.....L. P. Doyle
Contagious Abortion.....Dr. J. L. Kixmiller
Serving a Community.....Dr. R. C. Julien
6:00 P. M. Banquet
Septicemia Hemorrhagica in Cattle.....Dr. J. C. Rodger
Feeding and Care of Sheep.....Prof. H. E. Allen, Purdue

KEYSTONE VETERINARY MEDICAL ASSOCIATION

The regular monthly meeting of the Keystone Veterinary Medical Association was held on Tuesday evening, February 12th, 1918, at 8 P. M., at the Chamber of Commerce, Widener Building, Philadelphia. Meeting was called to order by the president. There was an exceptionally large attendance.

Major S. H. Gilliland of the U. S. Veterinary Corps gave a very interesting talk and blackboard demonstration of the work of the veterinarians in the Army, and said that we should feel very proud as the veterinarians had made big strides in a short time, and that there was a great deal of responsibility on the veterinarians in the Army. He said we had about 340,000 horses and mules in the Army at present, but expected to have about 1,000,000 later on, and that each veterinarian had to care for 400 horses. His explanation was so thorough that everyone enjoyed it very much.

Dr. Cassius Way, Chief Veterinarian, Borden Farm Products Co., Inc., New York, N. Y., gave a very interesting talk on some of the work they were doing along the lines of producing a high standard of milk, and the eradication of infectious abortion and tuberculosis. He laid a great deal of stress on the physical examination of cattle for tuberculosis and said that they felt they could detect most of the cases of tuberculosis that would spread the disease, and also encouraged very forcibly the sanitation of dairy farms and said they paid a bonus to the dairyman who produced the best grade of milk. This brought forth a great deal of discussion by Drs. Kelly, Reichel and Deubler. Afterwards a rising vote of thanks was given to Dr. Way for his very interesting talk.

Meeting adjourned at 11 P. M.

C. S. ROCKWELL, Secretary-Treasurer.

—Dr. R. R. Dykstra of the Surgical Department at Manhattan has been appointed Veterinarian of the Kansas State Board of Agriculture for 1918.

COMMUNICATION

DR. C. J. MARSHALL'S PROMOTION

Editor Journal of the American Veterinary Medical Association:
Ithaca, N. Y.

Announcement from the War Department of the promotion of Dr. C. J. Marshall from the rank of Major to that of Lieutenant-Colonel, in charge of the Veterinary Service of the United States Army, came as a pleasant surprise to his many friends at Harrisburg and throughout the state.

Dr. Marshall is a native Pennsylvanian and spent his early life on a farm in the rugged hills of Bradford County. After teaching in the local schools he entered the University of Pennsylvania and was graduated with the Degree of Doctor of Veterinary Medicine. He was made assistant to the late Dr. Leonard Pearson, who was then Dean of the Veterinary School, and later succeeded Doctor Pearson as Professor of Veterinary Medicine. On February 8th, 1911, he was appointed State Veterinarian of Pennsylvania by former Governor Tener and reappointed by Governor Brumbaugh. As President of the American Veterinary Medical Association, he attained national prominence in veterinary circles and has been actively connected with all important movements throughout the United States and Canada.

Dr. Marshall is one of the foremost authorities on matters pertaining to the health and conservation of live stock and has been largely instrumental in developing the live stock industry in Pennsylvania.

The promotion is evidence of the growing importance of the veterinary branch of the Army and indicates the extent to which it has been developed under Dr. Marshall's direction. Prior to the war, the highest rank attainable to army veterinarians was that of Second Lieutenant. During the summer of 1916, Dr. Marshall went to England and France to study the methods employed by the English and French Veterinary Corps under actual war conditions and returned with valuable data which was later used by the United States War Department in formulating a plan of organization.

Upon the entry of the United States into the war, the doctor was summoned to Washington as a member of the Advisory Board and was subsequently asked to accept an army commission with the rank of Major under a recent Act of Congress known as the Chamberlain Army Bill. His promotion to Lieutenant-Colonel is evidently in recognition of valuable services and untiring zeal and suggests further enlargement of the Veterinary Corps. At the present time there are about 1000 veterinary officers and enlisted men in this branch but if our Army in Europe is to consist of 4,000,000 men, many more veterinarians will be needed as it is estimated that horses or mules will be required in the proportion of one animal to four

men. Up to the present time there have been about 5,000,000 horses and mules used by the Allied Armies. They are used principally in the transport service from the base of supplies to the battle front as the intervening ground is so badly torn up that motor vehicles cannot be employed. According to the present plans of the War Department, the cavalry branch of the army is to be enlarged and extensively used and a large number of horses of superior conformation will be required. The average cost of a horse or mule when ready for service at the front is about $500.00. The value of an efficient veterinary service may be judged from these figures. According to a high authority of the British Army, the losses of army animals during the Boer War ranged above 60%, while the losses in the present great war, with an efficient service, have been about 8% from injury and disease, or about 12% from all causes including transportation by land and sea. W. S. GIMPER.

REVIEW

INFECTION, IMMUNITY AND SPECIFIC THERAPY
(Second Edition Thoroughly Revised)

A Practical Text-Book of Infection, Immunity and Specific Therapy with special reference to immunologic technic. By John A. Kolmer, M.D., Dr.P.H., M.Sc., Assistant Professor of Experimental Pathology, University of Pennsylvania, with an introduction by Allen J. Smith, M.D., Professor of Pathology, University of Pennsylvania. Second Edition Thoroughly Revised. Octavo of 978 pages with 147 original illustrations, 46 in colors. Philadelphia and London: W. B. Saunders Company, 1917. Cloth, $7.00 net; Half Morocco, $8.50.

Among the changes that stand out most conspicuously in the rapid advance of the biological sciences during the last few years are those relating to the processes of infection and immunity and the methods that have been devised for the diagnosis of infectious diseases and for the production of immunity. A new science of immunology has become permanently established. The bringing together of the theories and the practical methods for applying this new knowledge has been most admirably done in this edition.

The purpose of the book as pointed out by the author is threefold, namely:

"1. To give to practitioners and students of medicine a connected and concise account of our present knowledge regarding the manner in which the body may become infected, and the method, in turn, by which the organism serves to protect itself against infection or strives to overcome the infection, if it should occur,

and also to present a practical application of this knowledge to the diagnosis, prevention and treatment of disease.

"2. To give to physicians engaged in laboratory work and special workers in this field, a book to serve as a guide to the various immunologic methods.

"3. To outline a laboratory course in experimental infection and immunity for students of medicine and those especially interested in these branches."

The very close and intimate relation that exists between human and veterinary medicine in the technical methods of making diagnoses, establishing artificial immunity and the use of biologic products in the treatment of disease renders this comprehensive work of unusual interest to veterinarians. In veterinary as in human medicine the day is past when the practitioner can relegate the things of immunity entirely to the laboratory. Methods for diagnosis and the field of specific therapy are subjects of such practical importance that it is obvious that the successful practitioner can no longer be merely interested in these subjects.

The author has divided the subject matter into five parts. Part I consists of five chapters which deal with the general immunologic technic. Here the chapter on animal inoculation is of special interest to the veterinarian. Part II deals with the principles of infection. Part III, the principles of immunity and specific immunologic technic. This contains 20 chapters, several of which deal with matters closely touching veterinary work such, for example, as theories of immunity, phagocytosis, bacterial vaccines, antitoxins, agglutinins and anaphylaxis. Part IV, applied immunity in the prophylaxis, diagnosis and treatment of disease—specific therapy. In this the serum treatment of anthrax and hog cholera is quite fully discussed. Part V, experimental infection and immunity. This contains 60 systematically arranged exercises in the study of infection and artificial immunity.

The author has gone into much detail with the various topics naturally included under the subjects mentioned. While a large part of the methods described are applicable to laboratory workers, many of them should be of special interest to practitioners. The illustrations are good and very helpful in illuminating the subject. The publishers have done their part in making it an attractive volume. Although this book was prepared in the interest of human medicine, it contains much of value to the progressive

veterinarian, especially those interested in the principles of immunology and their use in diagnosis and prophylaxis. The author has given a generous number of references to the current literature on the general subject. V. A. M.

NECROLOGY

SESCO STEWART

Dr. Sesco Stewart, Dean of the Kansas City Veterinary College, died at his home, Feb. 7th, after an illness of nearly a month. He was confined to his bed by an attack of pneumonia, Jan. 9th, from which he had apparently recovered, when pneumonic meningitis began on the morning of Feb. 7th, bringing unconsciousness almost immediately and death within a few hours.

The doctor had experienced uncertain health for the past two years from gastric ulcer and cardiac insufficiency and his friends who attended the A. V. M. A. meeting were concerned about him at that time. During his illness he was happy and content, referring often to the satisfaction he had experienced then in the knowledge that he had expended his life in the accomplishment of those things that benefited the great profession in which he labored with real joy.

After lying in state at the college on the afternoon of Feb. 9th, a simple funeral was held from the residence, 2613 Olive St., Feb. 10th.

Dr. Stewart was born at Weston, Ontario, Canada, March 23d, 1855, and moved with his family to New York State when a small boy. His early life was spent in that state and at Corry, Pa., which latter place was looked upon by him as his home.

He received his common schooling in the public schools of New York State and his high school training in the Academy of Maysville, N. Y. In 1875 he entered the Medical Department of Wooster University, at Cleveland, Ohio, graduating in 1878, locating in practice at Oakland, Ia., the same year. Six years later he entered the Veterinary Department of Iowa State College, receiving his Veterinary Degree in 1885 and engaging in practice at Atlantic, Ia. Three years later he moved to Council Bluffs, where

he remained until 1891. In the meantime he took up the study of microscopy, which qualified him to accept a position for the inspection of pork for export, with headquarters at Omaha. In 1892 he moved to Kansas City to take charge of the inspection force there.

Shortly after reaching Kansas City, Dr. Stewart became interested in the Kansas City Veterinary College and was the moving spirit in the reorganization of that institution in 1895, being selected as President of the institution that year. A year later he became Secretary-Treasurer, which office he held at his death. In 1901 he resigned his position with the U. S. Government to give his whole time to college affairs.

Dr. Stewart was president of the Iowa Veterinary Medical Association in 1886 and secretary from 1887 to 1892. In 1895 he was elected secretary of the American Veterinary Medical Association, serving in that capacity until 1903, when he was elected president. It was through his efforts as secretary that the association grew to the substantial organization it now is. He was a charter member of the Missouri Valley Veterinary Association, which he served twice as president. In 1911, when the Missouri Veterinary Medical Association was all but dead, Dr. Stewart's election as secretary revived the organization which soon had an active membership of nearly two hundred.

Dr. Stewart was married on Christmas Day, 1879, to Miss Emma B. Beebe, of Corry, Pa., who survives him. To them were born two children, Lena Belle, who is now Mrs. Chas. D. Folse, and Ross R. Stewart. Dr. Stewart was a member of the Presbyterian church, in which he was a loyal but unostentatious worker. He gave his support to the republican party, but was not very active in politics.

Those who had the pleasure of a close personal acquaintance with Dr. Stewart know him to have been an untiring worker who set aside all thought of personal gain or aggrandizement in the accomplishment of an ideal. The monument to his zeal, in the college he fostered, has been the wonder of many educators, who were often wont to say, "How is it possible for you to do it"? His coworkers know the answer to be "everlasting toil and sacrifice".

Dr. Stewart was a keen thinker, a wonderful planner, and a successful financier, endowed with a remarkable foresight, and yet his demeanor was ever humble. Without noise or bluster he

did things and continued to do things up until the day of his illness. In his attitude he was always composed and kindly. Those who have been near to him remember no unkind utterance concerning any man even during times when others were unkind to him. In the hearts of fifteen hundred alumni, two hundred odd students and hundreds of others there burns a love for this man, a love which any may well covet for himself.

A TRIBUTE TO SESCO STEWART

Faithful official in the building of the Bureau of Animal Industry and its foreign commerce for our country in its outlet of our animal food products, through its inspection service, to foreign lands and added safety for our home consumption.

Loyal and true association worker, steadfast, zealous and helpful in the upbuilding of association service and endeavor. A master of detail in official association duties and one of our number with firm convictions, keen foresight and of the highest ideals.

A worthy adversary, for I have many times met the power and force of his earnest convictions. No one ever had cause to doubt his position, and when the smoke of battle was over, whether he won or suffered defeat, he was the same strong, earnest association advocate and worker and bore no malice toward any one.

He hated a dodger, a side stepper or one swayed by every breeze that made it easy for men to go along the lines of least resistance.

He gave to veterinary education, his life work. He endowed it with his fortune. He met every question that arose, manfully, and all that he possessed of strength, of power, of wealth, he gave to veterinary science in the great Middle West.

He was the acknowledged leader of those who recognized, maintained and realized that our country still needed the aid of private schools, and that the great West had a vast number of places and demands that required veterinary services, that Ames, Pennsylvania, Cornell, Columbus and Fort Collins were not meeting, and that so long as State veterinary education was being maintained on so parsimonious a basis, that private schools still were needed in the building of animal industry, the strengthening of animal husbandry and the immediate needs of thousands of communities.

With R. C. Moore, Jensen, Kinsley and others he reared the greatest private veterinary school in our land. He with others pledged their fortunes, their knowledge and their devoted lives to making it the best equipped private veterinary school in our land, not linked with any great university to support and aid its work. In buildings, in laboratories, hospital facilities, assembly rooms, gymnasium, Christian association work and a hundred helpful means for deserving struggling students, he maintained the highest ideals among the student bodies, not attained in some State supported schools, with their corps of salaried professors and instructors.

In many instances when their attained degree was reached and the new worker for the profession found his funds exhausted, he with others planned ways and means for their equipment for practice and thus made it possible for a large number to enter the profession, become useful, helpful men in their communities and the teaching and example of his own life, gave equal assurance that they would become equally good citizens.

Sesco Stewart's life will not fade in the memory of those who had mingled with him as it was my great privilege for more than a quarter of a century, neither will the judgment of some who attacked his motives tarnish his good name.

Recollections of his fidelity to the profession, earnestness of his convictions, fairness as an adversary, courage to give to veterinary medicine all the world gave to him, will linger long in the memories of many of us and when future time will write the story of the vast number of good things he did, all the overt acts of his life will be overshadowed and forgotten.

He seemed to have died too soon. His work was not finished. My own life was blessed by a long and intimate acquaintance and a knowledge of his inner thoughts. W. HORACE HOSKINS.

Feb. 14, 1918.

IN MEMORY OF DR. SESCO STEWART

T. P. WHITE

Again we mourn!
Death has taken from us
A veterinarian, a colleague and a friend,
Grown wise in science's lore
Through years of study deep.
A master he, of language and of thought,

Eager ever to enlighten
The Student mind.
His task was great and yet 'twas truly done,
For as he sowed a knowledge broad and sound
An hundredfold has the reward been great.
For lo! Today a broad array of men,
Trained and equipped in scientific life,
Stand proudly forth to testify
The worth, the truth and final strength
Of his teachings and fatherly advice.
With his loved ones, his relatives, and friends,
The profession has joined
In sorrowful regrets, knowing full well
The loss it has sustained.
But through it all there is the soothing thought
That he has gone to a reward
Greater by far than all the earthly praise.
For tasks well done, for love of fellow man,
He has received the Degree Eternal
That God bestows
On those who know and keep His Laws.

DR. GEORGE R. WARD

Dr. George R. Ward, of the Bureau of Animal Industry, died suddenly in San Francisco, December 23, 1917, of acute diabetes.

Dr. Ward was a graduate of the San Francisco Veterinary College and a member of the American Veterinary Medical Association. He had been at the San Francisco Meat Inspection Station of the Bureau for many years. Less than a month previously, he was present at the organization meeting of the Bay Counties Veterinary Medical Association, and the report of his sudden death came as a shock to his many friends in the Bay cities.

DAVID C. HANAWALT

Dr. David C. Hanawalt died at Louisville, Kentucky, February 1, 1918, after a brief illness from septic meningitis. He was born in Ross County, Ohio, November 10, 1871, and was graduated from the Ontario Veterinary College in 1891. He entered the service of the Bureau of Animal Industry through civil service examination March 1, 1900, and was continuously employed with the exception of three years when he engaged in private practice. During his Bureau service he was assigned most of the time to field work in connection with the eradication of contagious animal diseases, and at the time of his death was inspector in charge of educational and demonstrational work in regard to hog cholera for the State of Kentucky.

MISCELLANEOUS

—Dr. L. F. Ross has removed from Pittsburgh, Pa., to Belpre, Ohio.

—Dr. G. E. Butin has removed from Kansas City, Mo., to Bellevue, Neb.

—On February 5th occurred the marriage of Miss Martha E. Grubbs of Davisboro, Ga., to Dr. Robert C. Thumann, of the Bureau of Animal Industry, at Statesboro, Ga. Dr. and Mrs. Thumann will be "at home" at Orangeburg, S. C.

—Dr. Ernest E. Lent, formerly at Goodwater, Ala., has been transferred to Birmingham, Ala.

Ladies' Auxiliary Veterinary Relief Fund Committee. Eligibility to membership will include the wives, mothers, daughters and sisters of all veterinarians in the United States and Canada. The president, Mrs. W. H. Hoskins, was empowered to appoint a representative for each state to serve as a medium for communicating when necessary with the individual women within her jurisdiction, and also as a medium for them to communicate with the officers of the national organization. It is earnestly hoped that every woman eligible to membership will avail herself of this opportunity to assist others and through community of interest, learn to know more of other women connected with veterinary affairs. The annual dues will be 50c, payable to each state representative, who, in turn will transmit them to the national treasurer. The fee for each individual is small, but if the ladies respond as is hoped, the total would make a working basis for definite war relief work. Subscriptions of larger amounts will be acceptable, but the annual fee of 50c is all that is required for membership. President, Mrs. W. Horace Hoskins, 135 E. 30th St., New York City; recording secretary, Mrs. Charles E. Cotton, 3145 Portland Ave., Minneapolis; corresponding secretary, Mrs. Asher Lockhart, Veterinary College, Kansas City, Mo.; treasurer, Mrs. H. Jensen, 1320 Main St., Kansas, City, Mo.

—A recent government report indicates that the number of students commencing the study of veterinary medicine at veterinary colleges of the United States for the session 1916-17 was 673, or 51% less than for the preceding session. The combined attendance at all colleges was 2661, and, of these, 774 completed the session and were graduated.

—The U. S. Civil Service Commission announces a competitive examination, March 6, for veterinarian vacancies in the Bureau of Animal Industry at an entrance salary of $1500 a year, and positions requiring similar qualifications will be filled from this examination.

—Dr. F. C. Waite, professor of histology and embryology in the schools of medicine and of dentistry of Western Reserve University, has been recalled to Washington to assist Major H. D. Arnold, M.R.C., in a new division of the Surgeon General's office. This division is to have charge of medical, dental, and veterinary students who, under the provisions of the selective service act, are enlisted in the reserve medical corps and placed on inactive service until they finish their professional training. Any student who does not make satisfactory progress will be dropped from the reserve corps and become liable to call for immediate active military service. The division is also to have oversight of the medical, dental and veterinary schools in which those men are studying, and to determine what schools throughout the country are equipped to give satisfactory professional training for medical services.—*Science.*

—Dr. J. F. Winchester of Lawrence, Mass., with the local board of health, has entered a protest against a bill before the legislature relative to re-quarantining of animals after they have been released from quarantine, on the ground that any animal affected with tuberculosis or a dangerous disease cannot be quarantined or isolated by a local inspector for 30 days after being released from a previous quarantine by the State Commissioner or one of his representatives, as during the period it would be injurious to the public health to have diseased animals at large.

—Dr. Van Es Goes to Nebraska. Dr. L. Van Es, widely known as an animal pathologist, has been chosen to take charge of the Department of Animal Pathology at the University of Nebraska, Lincoln. Laboratories for this department are shortly to be erected at a cost of from $60,000 to $100,000. The Nebraska Legislature at its last session made a special appropriation for research work in animal diseases and Dr. Van Es was finally prevailed upon to consider an offer. For several years he has been Dean of the Veterinary Division of the North Dakota Agricultural College. He is a native of the Netherlands. In 1907 and 1909 he was sent by the United States Department of Agriculture on special missions to Europe. He will take up his work at the University of Nebraska next July.—*Breeder's Gazette.*

VETERINARY MEDICAL ASSOCIATION MEETINGS

In the accompanying table the data given is reported by many Secretaries as being of great value to their Associations, and it is to be regretted that some neglect to inform us of the dates and places of their meetings.

Secretaries are earnestly requested to see that their organizations are properly included in the following list:

Name of Organization	Date of Next Meeting	Place of Meeting	Name and Address of Sec'y
Alabama Vet. Med. Ass'n	.....	.....	C. A. Cary, Auburn
Alumni Ass'n College of Vet Med. O. S. U.	.....	Columbus.....	W. R. Hobbs, care O. S. U., Columbus. Ohio.
Alumni Ass'n, N. Y.-A. V. C	.....	338 E. 26th St.	Jos. A. DeGroodt, Mendham, N. J.
Alumni Ass'n U. S. Coll. Vet. Surgeons	April, 1918...	Wash.. D. C....	.....
American V. M. Ass'n.....	August 19, 1918	Philadelphia...	L. A. Merillat, 1827 Wabash Ave., Chicago, Ill.
Arkansas Veterinary Ass'n.	.....	.....	R. M. Gow, Little Rock
B. A. I. Vet. In. A., S. Omaha	3d Mon. each mo.	S. Omaha, Neb	J. V. Giffee, So. Side, Omaha
British Columbia Vet. Ass'n	.....	.....	K. Chester, New Westminster, B. C.
California State V. M. Ass'n	.....	.....	F. M. Hayes, Davis
Central Canada V. Ass'n...	.....	.....	A. B. Wickware, Ottawa
Central N.Y.Vet. Med. Ass'n	June and Nov.	Syracuse.....	W. B. Switzer, Oswego
Chicago Vet. Society.....	2d Tu. each mo.	Chicago.....	A. A. Leibold, Chicago
Colorado State V. M. Ass'n.	.....	.....	I. E. Newsom, Ft. Collins
Conestoga Veterinary Club..	2d Tu. each mo.	Lancaster, Pa.	H. W. Barnard, Sec'y
Connecticut V. M. Ass'n...	Feb. 5, 1918...	Hartford.....	A. T. Gilyard, Waterbury
Dominion Vet. Meat Inspectors' Ass'n of Canada...	3d Sat. ea. mo.	Toronto	T. E. H. Fisher, Toronto
Genesee Valley V. M. Ass'n.	2d week in Jan	Rochester.....	J. H. Taylor, Henrietta, N.Y.
Georgia State V. M. A.....	.....	.....	P. F. Bahnsen, Americus
Hudson Valley V. M. A.....	.....	.....	W. H. Kelly, Albany
Idaho Ass'n Vet. graduates.	.....	.....	C. V. Williams, Blackfoot
Illmo Vet. Med. Ass'n.....	.....	.....	L. B. Michael, Collinsville, Ill.
Illinois State V. M. Ass'n..	.....	.....	L. A. Merillat, Chicago
Indiana Veterinary Ass'n...	.....	.....	G. H. Roberts, Indianapolis
Iowa Veterinary Ass'n.....	.....	.....	H. D. Bergman, Ames
Kansas State V. M. Ass'n..	.....	.....	J. H. Burt, Manhattan
Kentucky V. M. Ass'n.....	.....	.....	D. E. Westmoreland, Owensboro
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Maine Vet. Med. Ass'n....	.....	.....	M. E. Maddocks, Augusta
Massachusetts Vet. Ass'n..	Monthly.....	Quincy House, Boston.....	E. A. Cahill, Winchester
Michigan State V. M. Ass'n	.....	.....	W. A. Ewalt, Mt. Clemens
Minnesota State V. M. Ass'n	.....	.....	G. Ed. Leech, Winona
Mississippi State V. M. Ass'n	.....	.....	E. S. Norton, Greenville
Missouri Valley V. Ass'n..	.....	.....	R.F.Bourne, Ft. Collins, Col.
Missouri Vet. Med. Ass'n..	.....	.....	Chas. D. Folse, Kansas City.
Montana State V. M. A....	Jan. 25-26, 1918	Great Falls....	A. D. Knowles, Missoula
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South Dakota V. M. A.....	.....	.....	S. W. Allen, Watertown
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Southeastern States Vet. Med. Ass'n.....	Feb. 20 22, '19	Birmingham, Ala.	G.A.Roberts,W. Raleigh,N.C.
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V. M. Ass'n, New York City.	1st Wed. ea. mo.	338 E. 26th St.	R. S. MacKellar, N. Y. City
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Wisconsin Vet. Med. Ass'n.	.....	.....	W. A. Wolcott, Madison
York Co. (Pa.) V. M. A.....	June, Sept., Dec. March.....	York.....	E. S. Busticker, York, Pa.

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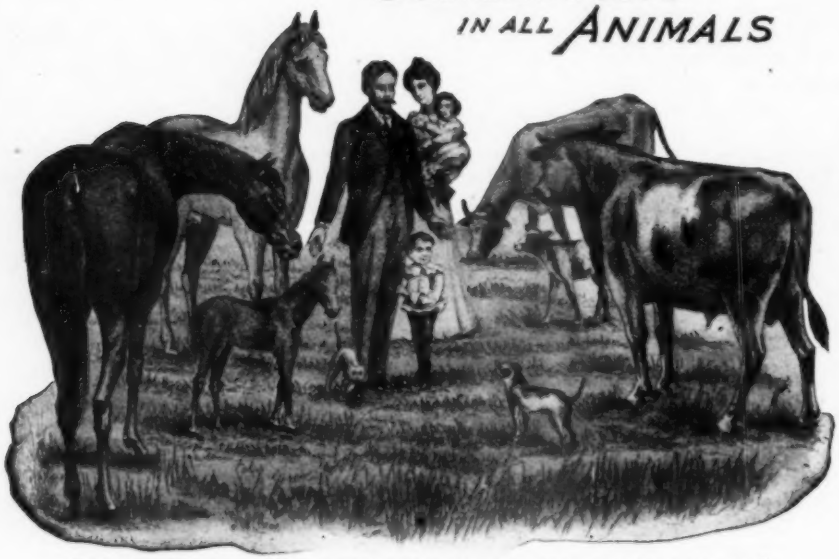

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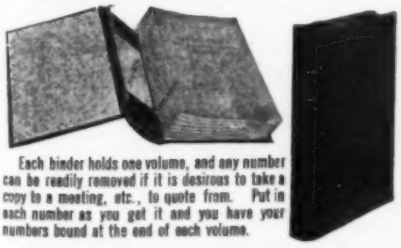

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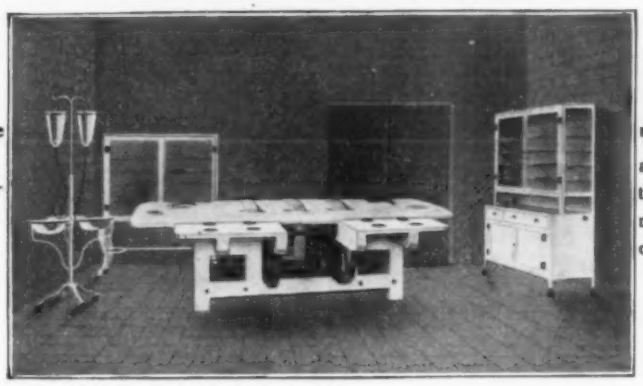

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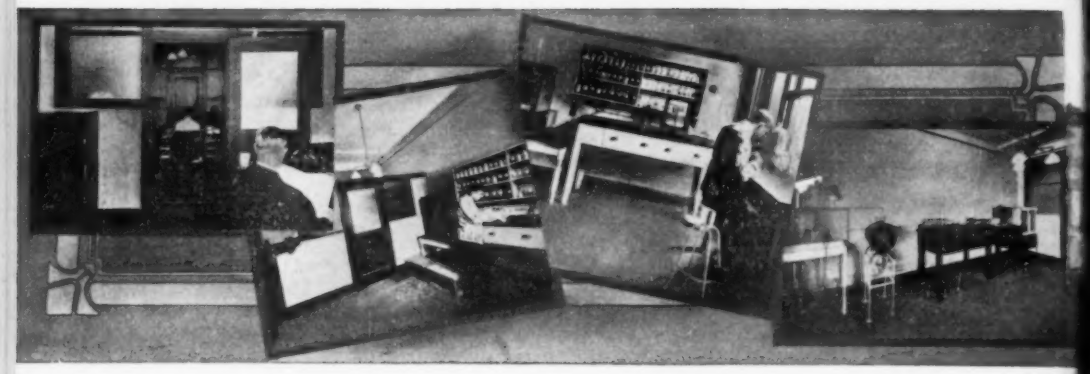

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